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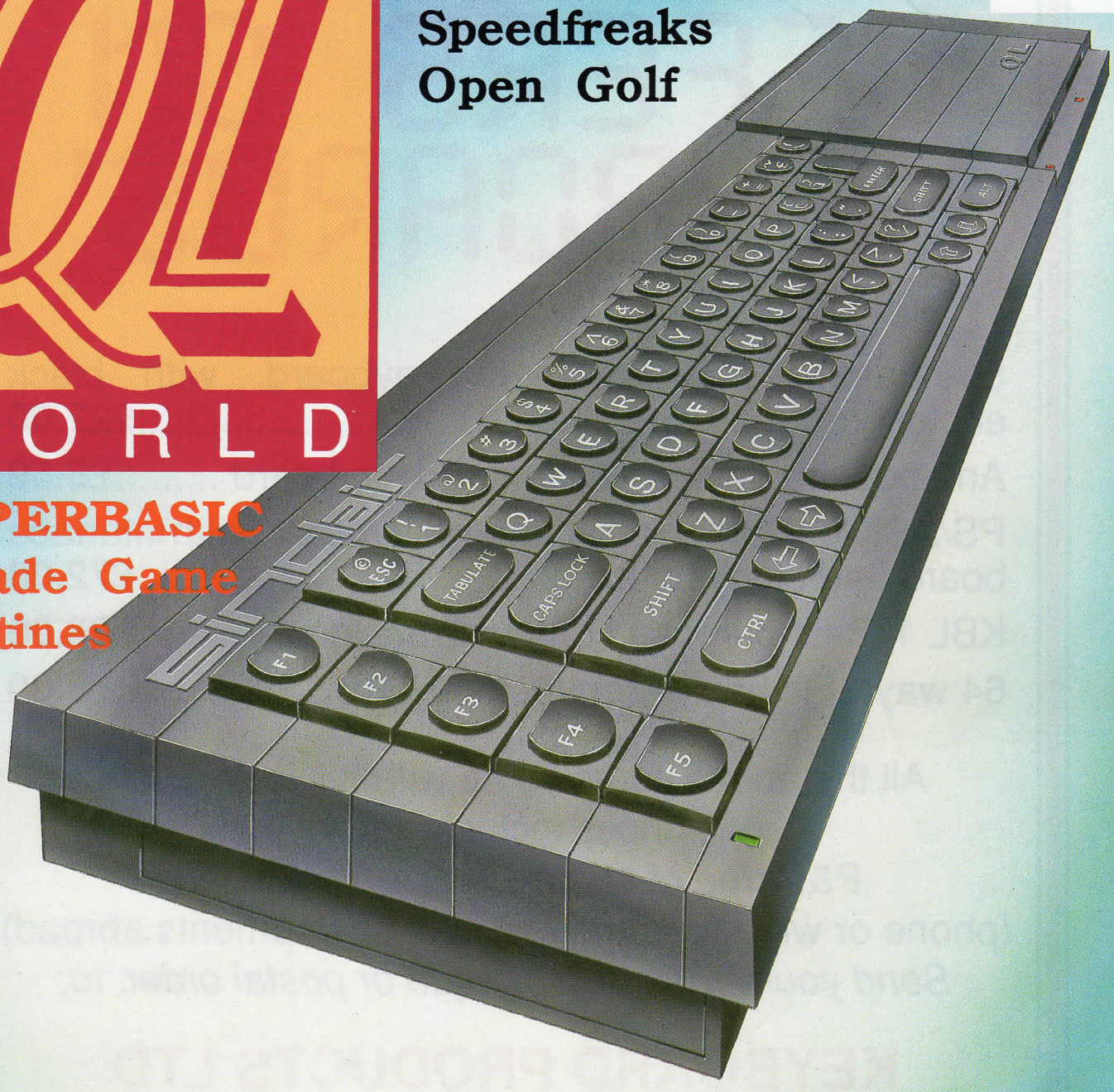

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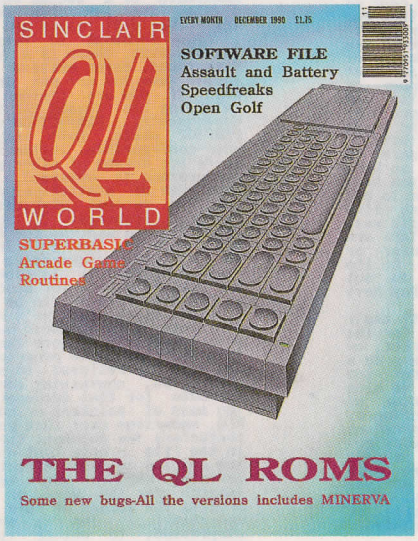

NEXT MONTH

THE REALLY USEFUL ABACUS and EASEL BOOKLET

In the January issue, QL World will be giving away a free booklet on using Abacus and Easel, to match this issue's Archive booklet.

ARCHIVE FOLLOW-UP

After the Really Useful Archive Booklet, we follow up with a short introduction to Archive programming for beginners.

PERFECTION
PERFECTION PLUS

NEW!

DIGITAL PRECISION LTD

Not just a word-processor - this one is THE word processor.
From the same inspired team who brought you classics like LIGHTNING SPECIAL EDITION and PC CONQUEROR, Digital Precision presents a product that will revolutionise the way you use your QL. Let us tell you how **PERFECTION** will do this.
Several hundred thousand QL users have grown familiar with the free word processor that was bundled with the QL. On the plus side, its use could be mastered in a few minutes thanks to its simple menu system, and it is reasonably WYSIWYG (What you see is what you get) in appearance. On the minus side, it is very slow, sometimes idiosyncratic (in what it prevents you from doing, or the roundabout way in which it forces you to go about things that should have been straightforward) and very many commands that we think should have been provided with it simply weren't. Valiant attempts to accelerate it by "patching" it have achieved only a 20% speedup.
There is, however, no getting away from the fact that the majority of QL owners still use Quill as their main program. They have grown used to the user interface of the bundled programs, and are reluctant to invest time in learning some totally incompatible system, whatever its claimed advantages might be. So - using their ingenuity, for QL people are an ingenious tribe - users have put up with the inadequacies and slowness, and enjoyed Quill's friendliness.
You are probably just such a QL user yourself....
Now here is a product CREATED JUST FOR YOU.
A word processor that you can master in just a couple of minutes.
A word processor whose user interface uses precisely those keys that you would expect it - from intuition or experience - to use.
A word processor that is menu-driven (multiple page menus) so there is absolutely no need for you to remember anything or ever refer to the manual: the menu is on the screen all the time. A word processor that is intuitively obvious to operate: even more obvious than was the bundled one. If you have become at all used to the F3 interface, you will love this enhancement! A word processor that is designed for Absolute Beginners and Advanced Users, for Complete Wallies and for Albert Einsteins alike.
A word processor that is delightful to use for letters and documents of but a few pages as well as for articles, journals, magazines, books, theses or manuscripts hundreds of pages long.
A word processor that can unleash the power of your printer, whatever its make, and squeeze the very best from it. A word processor with a very flexible user-configurable printer driver: one, however, that you should never have need to configure(!), as it works as shipped with Epson-compatibles and most non-compatibles, and if you have an esoteric printer, it can utilise your existing configured Quill printer data file, automatically, if you want it to! With this word processor you do not have to buy any extra printer drivers - you get everything you need right from the start.
A word processor with full on-screen indication of character mode - bold (i.e. emphasised) appears bold on screen, underline appears underlined, italics appear in italics, superscript and subscript appear superscripted and subscripted.... Other "special" type modes - dependent on the capabilities of your printer, like switching fonts, pitches, NLQ/draft mode, proportionality, double-strike, or anything else you choose - are indicated on screen by variations in ink/strip colour combinations, just as the most advanced PC word processors do. You can even make up your own "attributes" to be displayed on-screen in a particular ink/strip. Combinations of attributes are permitted - the display copes fine. Never before have things been so clear and simple....
That **PERFECTION** manages to do all this is remarkable. That it manages to do it at all fast would be amazing. But the truth is, in fact, much much better. **PERFECTION** is by far the fastest word processor for the QL, being DOZENS of times faster than Quill on many operations (a minimum of five times faster than it on everything), and - yes - many times the speed of our own beloved and excellent Editor, and far far ahead of all the others.
This may seem impossible to you. Two years ago, before we started work on **PERFECTION**, it would have seemed impossible to us as well! But a remarkable bit of software technology has enabled us to achieve this incredible acceleration. Of course you don't need to know or understand how we have accomplished all this in order to enjoy to the full the benefits of **PERFECTION** speed: if you want to know anyway, look at the technical section later on.
If you already use Quill or ANY OTHER QL WORD-PROCESSOR, you will be overjoyed to know that **PERFECTION** can load your existing saved files (_doc or _lis or ASCII) directly, with no conversion process required. This - together with the automatic reading of existing printer driver data - takes all the trauma out of the move to an exciting new system! And **PERFECTION** files are usable with PC/ST/Amiga word processors too.
PERFECTION comes with a multi-function configurator that allows you - if you want - to tailor-make a version specific to your tastes. Practically everything that is settable at run-time is also pre- configurable, making **PERFECTION** comfortable to operate. As you become more familiar with **PERFECTION** and no longer need the menu options to be visible all the time, you can toggle the menu off, freeing all the screen for your document. You can configure **PERFECTION** so that on startup the menu is either visible or not. As you become even more familiar with **PERFECTION**, you can opt to bypass the menu system entirely, and use alternative direct keypress commands to access **PERFECTION**'s power even more rapidly.
PERFECTION natively multitasks (of course) which means that without any other tools you can run multiple copies of it simultaneously, as well as run it at the same time as other pieces of software. Even if you choose to run only one copy of the program, you still have the option to look at more than one part of the document at the same time. You can take a "snapshot" of part of the document, and keep that snapshot in view as you edit a totally different area of the document. Ideal for indexing or cross-referencing. You can set up macros so that making a glossary is easy. Also, you can have any number of blocks - not just one - defined in the document. You can undo/edit attribute changes with a single keypress - there's no need to laboriously "paint" over areas or navigate to the start and end of a highlighted area in order to adjust the attribute!
Being able to cope with human error is an important part of **PERFECTION** philosophy. For example, not only is there an Undo option, but you can also ESCape from any command. When you have right justification on **PERFECTION** will add pseudo-spaces to pad out the line. Pseudo-spaces look like spaces and print like spaces but when you left justify they are removed while real spaces - the ones you have entered (via the SPACE bar or TAB) are not. This means if you accidentally right-justify tabular or columnar data, a simple left-justify will get it back to its exact original state. Most other word processors do not distinguish between spaces you have entered and spaces they have inserted, and hence cannot auto-recover.
Many users need the uuse (sic) of a spelling checker with their word processor. Adequate spelling checkers already exist for the QL, and for users who either do not want a spelling checker, or who do not want one as yet, or who already have one and are on a tight budget, we supply a version of **PERFECTION** without any built-in checker. But to get the best out of **PERFECTION**, we also supply it bundled with a dedicated Spelling checker of unsurpassed speed. There are even two levels of dictionary supplied (you get both) - the larger one is 225,000 words (no more hassle of having a checker which doesn't know the words you use: this dictionary is about 400% larger than its nearest competitor!) and a compact one: use the latter if you are short of memory, or when your document is really huge. You can add new words to the dictionary as well as create new dictionaries. With either dictionary **PERFECTION** PLUS one checks as you type, or checks saved files, or - BEST OF ALL - spell-checks interactively from any one point in the document to another.
If you already have our Editor Special Edition and use it for documents, database work or programming, you will find **PERFECTION** a wonderful treat. **PERFECTION**'s WYSIWYG behaviour, greatly enhanced document facilities ("tells you everything" status line, available word/line/character counts, regular and forced page breaks, headers and footers), menu-driven options and VERY MUCH GREATER SPEED make it an ideal upgrade. There are hundreds of detailed changes - to give but one: paragraphs do not need to have a blank line between them in order to distinguish them any more . There remains an area, however, where Editor Special Edition remains supreme - the editing of "non-printable" data, the ability to handle the entire ASCII character set from codes 0 to 255. So if you are a technical or semi-technical user and do not have either Editor Special Edition or **PERFECTION**, your best buy is the two programs together (they can interact, coexist, work simultaneously and have fully-compatible file formats). You will then get Editor Special Edition at HALF PRICE (Special Offer - limited duration).
The characteristics of a good database are its ability to Store, Retrieve and Manipulate information rapidly. By this criterion, this word processor makes an ideal database system too, as it is blindingly fast and flexible. Forward and backward 'Search' takes at most a couple of seconds, even when you have a document that fills an 896K Trumpcard system to the brim! Cursor navigation is also unbelievably fast and smooth, with an accelerating rate of scrolling if you indicate impatience. And there are macros, programmability and more for the more advanced user. If you have been unhappy with the speed or complexity or non-programmability of your existing database, **PERFECTION** will solve your problems.
PERFECTION can even access your existing Archive export files.
And if you want full desktop publishing capabilities (the use of fonts that your printer does not possess, and graphics) interlinking **PERFECTION** with Professional Publisher is a doddle. Use **PERFECTION** for creating, editing and manipulating, and "pour" the result into Pro Publisher.
But first and foremost **PERFECTION** is a user-friendly, familiar user-interface, stand-alone WYSIWYG dual-control (menus or direct commands) word processor of enormous power and blistering speed, which (for the first time) makes output to printers hassle-free. There is nothing else like it or even remotely as good as it on the QL or on anything else. **PERFECTION** is our best yet.
PERFECTION is for you whether you hate your existing word processor, are indifferent to it or love it. **PERFECTION** will let you forget about all the technology and concentrate only on the writing.
PERFECTION costs just £79.95 including integrated printer drivers, ancillary programs and jargon-free, friendly but to-the-point documentation (that you will probably never need to read through!). **PERFECTION** PLUS comprises **PERFECTION** plus the dedicated Spelling checker with dictionaries and costs just £119.95.

TECHNICAL INFORMATION ON PERFECTION

You don't actually need to read or understand this.
PERFECTION gets its superb speed from two sources. Firstly, **PERFECTION** - unlike virtually any other word processor - is written entirely in 100% hand-written machine code. This gives us a considerable speed advantage over compiled alternatives. Had we written **PERFECTION** in a high level language it would have been 4 times slower, 6 times bulkier and taken us a great deal less time to produce. You reap all the benefits of our hard work.
The other source is design. There are two formats for internal data storage for character handling programs. Many store data serially, in a long stream of characters. Ones like Editor store data as lines scattered through RAM, with a table of pointers to the lines - a far more advanced method. The first format has the advantage that it is cheap to program - the user pays the cost in terms of performance, with sluggish block-defining/moving, navigation and insertion. The second format has advantages including instant random access to any line and quick insertions and deletions - the disadvantages may include heap fragmentation that will result from repeated grabbing of small chunks of space (garbage collection may be required periodically if space is short). Both formats share the disadvantage that "global" changes made to a part of the document - say a switch to bold at the top - will take a long time to filter down through the system to become visible on-screen at lines at the bottom.
PERFECTION uses a variant of the second format that does not have its disadvantages. Data is stored in RAM in optimally-sized chunks - a chunk being roughly the size of several screens. Each chunk has a control information area within it about the number of lines etc within it, the display status at the start of it (say bold on, italics/underline etc off). Whenever you are editing, the relevant chunk(s) are instantly loaded into a large work area that has slack space at both top and bottom. That means that you can add or delete a great amount of data instantly, without **PERFECTION** having to bother about updating anything but the work area. Only when you move over the edge of the work area will **PERFECTION** need to housekeep outside the work area: the housekeeping itself is then very very fast, as only control information areas need to be updated. There is no need for a general scan through all following text. There are many more speed and power advantages to our system. There is one big disadvantage - it is an absolute nightmare to design and implement! Fortunately for you, you don't have to know anything about it - it just works like clockwork, automatically and behind the scenes.
Other elements of **PERFECTION** design to enhance performance include lazy screen (when you keep a key pressed in order to get somewhere, we stop updating the whole screen and instead just scroll the line your cursor is on) and lazy attributes (where in a huge document of hundreds of pages you do a long jump - say from near the top to near the bottom, in one go, and we have not yet resolved the attribute status (say underline on) of the area you want to get to, we don't hold up the display for even one hundredth of a second while we are computing attributes, but display the new area immediately without any pause - the attributes will 'catch up' a second later: you will only see this if your document is very very big and you navigate in huge leaps). Also, there is a garbage job running all the time in the background, doing whatever internal tidying up and optimising is needed when you are not doing anything (with **PERFECTION**'s speed, even if you are typing at 200 wpm the program is sitting twiddling its thumbs for 90% of the time as it awaits input!). Consequently, **PERFECTION**'s internal tables are always in a PERFECT state. Both lazy screen and cursor acceleration are user-configurable, incidentally.
There are dozens of other more localised ways in which **PERFECTION** performance is obtained. For example, **PERFECTION** has built-in knowledge of statistical distribution of occurrence frequencies for the various alphabetic characters in English and other European languages. It uses this data as follows: if you ask **PERFECTION** to search for the word 'praxis' in your document, we won't look for the 'p' first. Instead, we automatically look for an 'x' (less occurrences of 'x') and having found 'x' then resolve whether it is embedded within an occurrence of 'praxis' (if not, we search for another 'x'). Obvious? We thought so. But no one else appears to be using this excellent trick. Or dozens of other tricks that we'd prefer to keep to ourselves...
For those with advanced needs, **PERFECTION** features include full programmability - more than just macros - with the ability to save and re-execute programs. There are over a hundred commands.
You will be relieved to note that **PERFECTION**'s file format is very clean, containing one short header (giving the margin/TAB etc data for that document) and then exactly what you typed in (no mass of pointers or counters). Changes of attribute (bold, NLQ, underline etc) that you have opted for are stored as control characters (we document the structure) in the appropriate places in the file - note that while the control characters themselves (as opposed to their effects, which are WYSIWIG'd on-screen) are invisible when you are viewing the file, you can edit/delete them (search for the next or previous bold text, say!) and even program the access to them (swop all bold for double-strike plus underline)... You can even opt to Export so the header is suppressed, to enable its direct use as a programming or technical front end, or to allow its output to be read in by other word processors (QL, PC or whatever).
The net result of all this is that in terms of features and performance, **PERFECTION** running on a QL will beat most word processors even running on state-of-the-art £7000+ 486 PCs... In a nutshell, **PERFECTION** will blow your socks off.

LIGHTNING SPECIAL EDITION
LIGHTNING

Until the autumn of 1989 the fastest way of speeding up your QL display was to buy **Lightning**, which greatly accelerated QL text printing, graphics and maths, without affecting compatibility at all. NOW you can buy **Lightning** Special Edition, which is significantly faster than **Lightning** and does a lot more! **Lightning** Special Edition is simplicity itself to use. Once it is loaded ALL programs will AUTOMATICALLY benefit from the enhancements it provides. If you are using a QL without **Lightning** you are probably a little pale (quote from John Norton of Sector Software), you should get out and about more... Go to some QL shows or meetings where you will see **Lightning** in action - or take our word for it. If you don't have **Lightning** you are WRONG.
Lightning Special Edition works by automatically (I know we keep using the word, but it is the only one that is really correct here) and instantly replacing QL ROM code (or Minerva code, for that matter - Minerva and **Lightning** complement each other superbly) that has usually been optimised for space, with extremely high speed routines written by us that do the same job but much faster. Screen output speed gets accelerated by factors from over 1.5x to over 10x (about 2x-4x is representative), graphics are drawn twice as fast (points are plotted 5 times faster) and internal maths is speeded up by 2x-5x (you can even vary the precision). There is virtually no cost in RAM (for example, you can still run Quill with a fairly large document on an unexpanded QL with **Lightning** Special Edition).
The Special Edition is supplied on EPROM plus disk/cartridge: if you already have something precious plugged into the QL's EPROM socket (at the rear), there is no problem - all the EPROM's functionality is duplicated on the other medium!
Lightning Special Edition provides more than acceleration - you can dynamically adjust channel parameters - like ink, paper, font, screen position, use over 80 fonts, a null device, a character drain and all sorts of other interesting gadgets.
Lightning Special Edition installation has been totally automated, and will not present you with complications no matter how computer-naive you are.
If you cannot afford the Special Edition, get **Lightning**. Refer to its review in September 1988 QL World to see how effectively **Lightning** acquitted itself.
Both of these programs transform the QL into an altogether more zippy, business-like, efficient, enjoyable machine.

PC CONQUEROR WITH MS-DOS
PC CONQUEROR

Terrific though we know the QL to be, we do feel the pressure to be "PC compatible" in today's world. There is increasing demand to be able to bring home and run the programs we use at work (or the other way around!), and to have access to the vast storehouse of PC software: word processors, databases, spreadsheets, expert systems, accounts and financial modelling packages, vertical market applications, visualisation aids, graphics/CAD/PCB designers, languages/compilers, operating systems, environments, utilities, adventures - you name it, there are scores of each type readily available for the PC. And thousands of shareware/PD programs too, most for the cost of a blank disk plus postage.
If you buy PC **Conqueror**, you will be able to run these programs! To boot up PC **Conqueror** takes 10 seconds from the F1/F2 prompt: thereafter, your QL is a HIGHLY compatible PC clone (indeed, more compatible than some "real" PCs). **Conqueror** is all-software. There is no comparison in quality between **Conqueror** and its predecessor: **Conqueror** has ALL the features of Solution (read the details later in this ad if you are unfamiliar with Solution's legion facilities), but is almost TWICE as fast: this has come about by our careful rewriting and optimising of Solution's code. As if the colossal speedup was not "enough", **Conqueror** (unlike Solution) runs perfectly even with PC software that makes various "non-legal" calls to the PC operating system. **Conqueror** runs with virtually anything that will run on a PC: QL Worlds from December 1989 to March 1990 listed several hundred PC programs/utilities found to work with **Conqueror**. It is simpler to say that we have yet to find a program that runs fine on a standard PC that doesn't run with **Conqueror**: we are aware, however, of programs that will run with **Conqueror** but won't run on some PCs!
Because in **Conqueror** we've cracked the problem of detecting when the PC screen has been changed, we need not slavishly update the screen many times a second (taking precious time away from the main PC-emulation job) as did Solution. Instead, we update the screen instantly it needs to be updated. This simple to understand but very hard to implement modification gives **Conqueror** additional (over and above what we've already discussed), "tunable" acceleration, as well as absolutely smooth echoing of keyboard input to screen (Solution could be a bit jerky when you typed quickly).
Conqueror's new features include a more flexible configurator and a better diagnostic and supervisor option, an enlarged manual (**Conqueror** itself is more compact!) with a troubleshooting chart, and a new mode of operation (in addition to the "normal" one of reading/writing PC disks directly) which allows you to create mini PC environments - you select the size, location and name - on any QL device (including floppy, ramdisk, hard disk and even mdv) which look like files from QDOS (and can therefore be copied with SuperBASIC's COPY!) but are indistinguishable from PC drives from within MS-DOS...
If you do not have legal access to a copy of MS-DOS , you need to buy MS-DOS too - but we sell it (with GW-BASIC, Shell and all the system utilities thrown in) at about half the normal price.
Of course QLs are better than PCs - but QLs that are PCs as well are better still. We will leave the last word to people who have already bought **Conqueror**. All these sentiments are unsolicited.
*"I wish to congratulate you on the excellent work you have done on **Conqueror**. The improvements in performance over Solution are astounding. Well done!" B.C.Papegaiij, Netherlands. "I am highly delighted with this new emulator. (Apart from the speed-up) it also appears to be more tolerant." L.Chandler, Peterborough. "Congratulations on bringing such a fast PC emulator into the world - on it, even Wordperfect runs at a reasonable speed." R.Williams, London. "I'm impressed with the improvement in speed over Solution." P.Vervoort, Netherlands. "Thank you for your prompt service. I have **Conqueror** up and running, and congratulate you on an excellent piece of software." G.Leagas, Hartlepool. "On some benchmarks almost as fast as a PC." P.Johnson, Stoke on Trent. "**Conqueror** is still a whole lot faster (even) without Lightning than Solution is with the assistance of Lightning." P.Christie, Glasgow, who went on to praise **Conqueror** for running software Solution couldn't handle. "**Conqueror**, to which I upgraded from Solution, is a delight to use by comparison!" B.Gouldwell, Dunipace..... V.Pakanen, Finland sums it all up rather well with - simply - "Excellent."*

PROFESSIONAL PUBLISHER

To show you a little of what our **Professional Publisher** can do, we have prepared our last advertisement using it. Notice from our May 1990 advertisement how we can wrap the result around graphics or in fact anything, of any shape. When we wrote **Professional Publisher** (**PP**), we knew it was a very special sort of program. **PP** can produce pages of quality - virtually indistinguishable from those prepared on professional typesetting kit, the only limiting factor might be your printer: however, while the very best output from **PP** will be obtained from 24 pin models and lasers, you will be stunned by what **PP** can squeeze out of the humblest 9-pin machine. Great care was taken in the design of **PP** so we were absolutely sure that no actual knowledge of, or practice with, desktop publishers was required in order to use it (the '**Professional**' in '**Professional Publisher**' refers to the output quality, not the level of operating skill required. When you use **PP**, you will notice that at each and every stage a menu is available (there are getting on for a hundred menus in total) with a list of options selected by using either the cursor keys and SPACE bar, or by pressing a digit key - use what suits you! There is context sensitive, on-screen help too. When you get more experienced with the program, you may select Command mode (using the Enter key) and choose operations directly, bypassing the menu system. **PP** is more user-friendly than any page-making program we have ever seen on any computer, period.
Let us talk you through how you might choose to produce a page or succession of pages. This is just one way you might proceed: **PP** does not impose any sequence of steps upon you, and you can omit certain operations altogether. You will have pre-configured **PP** to boot up with a generous lot of fonts (you select which ones you are likely to want - of course you can load in additional ones, or discard existing ones, at run-time too). You could then set the required page dimensions and orientation, as well as not-necessarily-symmetric margin, grid, gutter, column and navigation-guide positions (yes, half the **PP** manual is a glossary) - you could have pre-configured **PP** for these too, or loaded in alternative layouts (layouts are distinct from page contents) you've created in previous sessions. If you don't set layout we'll use the default, or the one used for the previous page. Now you would plan the page in detail. Laying out graphics (if any) comes next - you can create these in **PP** itself, with its superb rubber-banding, dozens of brushes, palettes, texture-fills and so on. Alternatively, you can load in screens created elsewhere, including Eye-Q, Easel, any other graphics programs or digitiser, into a cut and paste buffer where a dozen tricks (including resizing, slanting, scrolling and texturing) are available, and then take the finished product onto the page. This done, you might insert headlines or captions, selecting from the dozens of fonts available. Each font can be manipulated in billions of ways (yes, we mean thousands of millions): to give but two examples, you have a choice of 32 slopes for italics for the font, and dozens of aspect ratios are selectable. Now you might opt to get the main body or bodies of text down on the page. As fonts are defined to great accuracy (upto 2304 pixels PER CHARACTER!) jaggedness is a thing of the past, and visually the choice of fonts can only be described as stunning! You can do this either by directly typing it into cursor-dragged boxes (with all the options you would expect from a dtp system, and a few more besides), or by loading it in from file created by Quill, **PERFECTION**, Editor or other word-processor. The latter method is better (because you retain the text as a character stream rather than as pixels when you save the file). Highlights such as bold, underline etc which you may have inserted into the text are preserved. Indeed, you can control **PP**'s operation from within the text file itself. If you are an advanced user, you can even teach **PP** your own mnemonics, so that it switches between different styles and modes as it encounters instructions you put into your text file when you created it! The imported text file is editable within **PP**. It is up to you to decide where the text is to lie - **PP** places no restrictions on either the number or the shape of the windows into which the text is to flow: they need not be rectangular, and can have any irregular border, and can even overlap or be contained one inside another! You can freehand-draw (there's excellent rubber-banding to help you) the window borders as you choose, to get any effect you desire, to fill any space you wish and to avoid any existing material already on the page (or to reserve room for new material). Amazingly, within the window the text will all be perfectly micro-justified in the font(s) of your choice, however bent or contorted you made the border. Text will flow automatically from one window to the next either until you have run out of text or out of windows. There are many text formatting facilities: you can select word-wrapped, force-broken or hyphenated, and you can specify minimum numbers of "pre-hyphen" and "post-hyphen" characters so that absurd hyphenations are avoided (if no sensible hyphenation position can be found the word is wrapped instead). There are so many fine-tuning controls here that the rest of this ad could be devoted to describing them and would still leave things out! We will have to content ourselves with but one example: with micro-justification (pixel by pixel spacing, not crude character by character stuff) we even allow you to specify what % of padding space is to be allocated between characters and how much between words! Text work completed, you can then put in the final touches by adding borders, shadows, patterns or designs, overwriting or slipping under or combining these with existing material, repositioning parts of the page if necessary. The end result - be it for a letter, letterhead, document, manual, article, newsletter, magazine, book, thesis, ad - is far better than you have any right to expect from a piece of software costing under £2,500, let alone under £100...

PROFESSIONAL PUBLISHER TOOLBOX

NEW!

For Professional Publisher users - this useful addition not only supplies several man years worth of beautiful high definition fonts - including familiar types like Roman and Universal - but also contains many smaller fonts, more clipart and programs to load Sector Software clipart, filter text before importing into Professional Publisher, save parts of Professional Publisher pages as screens (for importing into any graphic program - like Eye-Q - or manipulating via SuperBASIC) etc. Excellent value.

FONT ENLARGER

For Professional Publisher users - loads of large fonts are automatically created by this multitasking utility, as and when you need them (or in advance), by enlarging existing smaller smaller fonts from **PP** itself and from Lightning Special Edition and hordes of other sources: with this there is NO jaggedness at all. A font editor for small and large (hdf) fonts is included.

GRAFIX

Scaleable output for all our desktop publishers on 9- and 24- pin printers: a useful alternative to the built-in drivers.

EYE-Q

There is no way to describe **Eye-Q** except as the best graphics program for the QL. This master is now four years old, and we have never felt the need to change anything. Its use is characterised by absolute simplicity, speed and power - it has that indefinable precision "feel" that is just right. All the expected manipulations are provided. Whether your needs are technical drawing, labelling, design, illustration, freehand work, copying - or just having fun, **Eye-Q** will not disappoint. Of course it is menu driven with context-sensitive help. The system takes 5 minutes to learn. The variable zoom and fill facilities, anti-fingerslip measures, cursor acceleration and so on make **Eye-Q** a classic in its own time.

ULTRAPRINT

To get the best printer output from Eye-Q or any other graphics program from any other source, **Ultraprint** delivers. An amazing 22 styles to choose from: enhance contrast (for line output) or gradation (for pictures) and vary magnification... A printer without **Ultraprint** is no printer at all.

MEDIA MANAGER SPECIAL EDITION
MEDIA MANAGER

MMSE is a joy to use. Whether something has gone wrong with a disk or tape ("Not found", "Not a valid Quill file", "Bad or changed medium", "Read/write failed" etc) or whether you want better control over your programs and data, **MMSE** should be to hand. Virtually any calamity can be recovered from automatically: all permutations (accidental deletion or part-overwriting, part-formatting, errors yielding: bad map but OK directory, bad

directory but OK map, bad map and directory, OK map and directory but bad file sectors, unknown fault, power glitch corruption and so on) have been carefully thought through and catered for. If nothing is wrong, but you just want to explore and understand more about your system, you can potter to your heart's content, assisted by the clear and packed-with-facts manual. Dozens of different diagnostic printouts can be produced. The whole system is menu-driven, with context-sensitive, on-screen help for every option. The speedy Sector Editor is a positive delight: the collector file facilities, bulk recovery, auto-navigation, skipping through the medium in physical, file (if map), logical (if no map) or uncollected/logical (if destroyed map, and because of "chequered" history with lots of overwriting/deletions no one-step recovery available) sequences must all be experienced to be believed. **MMSE** is extremely simple to operate, and assumes no advance knowledge whatsoever.
Alternatively, if you wish to tidy up your disks or cartridges, **MMSE** allows you to change volume format names, sort directories into alphabetic, date or size order, analyse file contents and histories, change case of filenames, move data/programs to/from alien-format disks, introduce or break copy-protection systems (illegal use prohibited!), **MMSE** can and will deliver the goods. It is absolutely superb.
The standard **Media Manager** is much less powerful, and less easy to use. It is only for those on a tight budget.

TOOLKIT III WITH ROM
TOOLKIT III

Virtually everyone with a disk system has Tony Tebby's fine TK2 Supertoolkit on board (usually built into the disk interface). **Toolkit III** - which works whether or not you have TK2 - takes off where TK2 ended, adding about 70 new commands and enhancing many existing QL and TK2 commands. **TK3** is for everyone with a QL. You can get this system on cartridge/disk, with or without a plug in ROM cartridge in addition. The documentation is complete and very comprehensive. Some of the added commands are:
ADIM * ADIMN * AND_L * ATYP * BASREF * BV_BASE * CHANNELS * CH_BASE * CINT * CLOSE% * DEVLINK * DIR_USE * DITs * DIV_L * EOR_L * EXTRAS * FACC * FLP_SEC * FLP_START * FLP_TRACK * FLP_USE * FRAC * ISFLT * KSINT * KEYS * LARRAY * LOWERs * MEMCOPY * MEMSWAP * MJOB * MJOB_W * MOD_L * NFS_USE * ODD * OM_INIT * ONPIPE * OR_L * PEEK_F * PEEKs * PEND * PIPE * POKE * POKE_F * PRED * QDOS$ * QIN * QOUT * QTEST * QWAIT * RAM_USE * REPLACE * REPLACE$ * RESET * RJOB_A * ROUND * SARRAY * SEARCH * SETDIR * SETDIR_A * SETHOST * SETNET * SETRO * SETRW * SETSYS * SETUSER * SGN * SORT * SORT_I * SUCC * TK3_EXT * UPPER$ * USER * WN_BASE * WSETHOST * WSETNET * WSETRO * WSETRW * WSETSYS * WSETUSER

QFLICK CARD INDEX SYSTEM

Few users actually require all the facilities of a complicated database like Archive. **QFlick** presents a very convenient alternative - a very fast, simple to use card-file database, with easy to learn, snappy search and navigate commands and clean file-handling. You can move Archive data to/from **QFlick**. You can run multiple copies of **QFlick** too.

PERFECT POINTER TOOLS

This excellent program gives you an on-screen pointer (arrow) environment and all the tools you are likely to need to run it.

QKICK MULTITASKING SYSTEM

A pull-down menu controlled multi-tasking program, ideal for running in the background and giving you notepads, file-handlers, quick backup, clock, diary, mini-database, calculator etc. **QKick** will allow you to multi-task the bundled Psion programs as well as virtually everything else.

DISKTOOL WITH QUICKDISK

An exciting way to accelerate disk access by upto 30%, add password protection to disks and to optionally increase disk storage capacity by 36K to 1512 sectors! All this works while still giving you full normal control of the disk.

DIGITAL C SPECIAL EDITION
DIGITAL C COMPILER

Superb C compilers these - fast in execution, they produce extremely speedy and concise code. No-nonsense documentation is included. The Special Edition has many more features, including pointers, long pointers, structures, >64K code sizes, direct access to traps and vectored utilities, and is twice as fast because of its more efficient C/QDOS libraries.

TURBO BASIC COMPILER + TOOLKIT

This state of the art system will automatically convert ordinary SuperBASIC programs - the sort you buy, write yourself or type-in from magazines - into machine code, the language of the 68008 CPU, the brain of the QL. Such pure machine code programs run "directly", without the need to be interpreted by any intermediary system. This direct execution makes them MUCH faster in execution than BASIC. **Turbo** also adds a host of useful high-speed commands (called "toolkit extensions" if you are fond of jargon). Here are some timings, all carried out on a JS Trumpcard QL, to give you a taste of just how much **Turbo** can improve things:

	Iterations	SuperBASIC	Turbo'd	Speedup
Empty FOR...END FOR Loop	30000	49 sec	1.3 sec	38x
Empty REPEAT Integer Loop	30000	151 sec	2.4 sec	63x
String concatenation	3000	448 sec	0.4 sec	110x
Search through memory	300000	1410 sec	1.5 sec	900x

Turbo's automatic conversion process, called compilation, is as simple as this: (1) Boot up with the **Turbo** disk (2) Load in or type in your BASIC program (3) Enter the word CHARGE, and watch the friendly front-end menu pop into view (4) Choose a filename for the machine code task that is to be generated and (5) Press the SPACE bar. **Turbo** does the rest! Compilation is a one-off process, and is very fast too - it takes little more time than LOADing the original program did! Once compilation is finished, you have a machine code version of the original program. Start this with EXEC, just as you used to invoke the original program with LRUN: besides the tremendous difference in running speed, you will notice that the program loading time is cut down to a few seconds at most (big SuperBASIC programs can take half an hour or more to load). The EXEC mechanism also allows you to multitask programs, something impossible with SuperBASIC, as well as manipulate their time-priorities, link them together, exchange data and even share parts of their code while executing.
If you are an advanced user, **Turbo**'s numerous fine-tuning facilities, 200-command toolkit (a terrific complement to the famous Supertoolkit) and 300+ page manual will be irresistable. If you are a beginner, you will wonder how you ever did without **Turbo**'s program diagnoses and auto-correction.
Turbo is more than a very clever optimising compiler. **Turbo** is magic. If you do not have it, you can have no conception of the experience you are missing and the power you are forfeiting.

SOLUTION WITH MS-DOS
SOLUTION

This program transforms your QL into a pretty compatible - albeit not fast - PC clone. **Solution** will run over 95% of the "big name" PC software you have read about, missing out only on programs that make illegal use of the PC's operating system. **Solution** works solely from software so you don't have to worry about ripping your QL to pieces to fit anything, or have anything hanging out of the back. Just boot up the **Solution** disk and you will be using a PC, which will then ask for a copy of MS-DOS (just as it would if you were using a "real" PC). End of story - you are now using a PC. There are very few restrictions: both mono and colour CGA graphics are supported. 479K is available for PC software on a 640K machine and 667K when using Trumpcard - more than you will get on a PC or XT! Speed can be increased by using Lightning Special Edition but in final analysis just can't compare with Conqueror's speed). Because your newly aquired PC is really a QL you can multitask two or three PC programs (try doing that on a "real" PC!). You can also run QL programs alongside PC programs (DON'T try that on a "real" PC!). Converting files (in either direction) between QL and MS-DOS is no problem and you can re-configure the QL keyboard if you wish.

PROFESSIONAL ASTROLOGER
PROFESSIONAL ASTRONOMER

Our use of the term "Professional" in the name of an application program does mean that the quality achieved will meet or surpass the highest professional standards for that application. The term does NOT mean that you have to have the knowledge of a professional in order to get the best out of the programs.
Astrologer teaches you astrology from scratch, and enables you to produce reams (if you are short of paper, you can choose exactly how much) of narrative printout giving a person's horoscope, personality delineation, year-to-year life overview, detailed day-to-day (in fact, minute-to-minute!) predictions, as well as two-person compatibility interpretations. Also provides all the technical readouts, charts and zodiacal wheels you would expect. It is extraordinarily fast (there is a great deal of very clever maths within it) and it performs the whole computation in under a second. The author of the manual is the author of this advert, so you can expect a lucid and humorous read! Whether or not you believe in astrology - indeed, especially if you do not - this program is one that you cannot afford not to have. Scores of detailed readouts for famous people are supplied, incidentally - very interesting reading they make too... Discover Mrs Thatcher's secret yearnings, explore yourself, play the Stock Exchange...
Astronomer is an extremely efficient solar system computer, with planetarium views, planet faces (with shadows/eclipses), five different co-ordinate systems, 1sec=1day cinerama, etc.
Astrologer + Astronomer is supplied at a very low combined price.

ACT SPECIAL EDITION

The **Adventure Creation Tool** is for every programmer or putative programmer. Whether or not you have any interest in adventures, you will find something useful here. Animated graphics, data compression, language design and parsing, maps, object-oriented control and much more, with an excellent educational manual too.

3-D PRECISION CAD SYSTEM

2-D and 3-D design and manipulation, at a speed sufficient to permit real-time animation! Whether or not your interest is serious, **3DP** will change the way you look at the world around us. The variation of viewpoint, perspective and magnification is very smoothIn addition to dot-matrix output, plotters are catered for.

SUCCESS

Run CP/M programs on your QL! What more is there to say, other than that after the PC family, no more common system exists than CP/M, with thousand of cheap programs... And **Success** is fast!

THE EDITOR SPECIAL EDITION
THE EDITOR

If your needs are for a technical Editor, or for full access to the entire ASCII character set (to handle machine code or compressed data files), or if your budget cannot stretch to **PERFECTION**, then this is the program for you. Editor is command-line driven and programmable. The Special Edition version is certainly better than the standard version: that is because the standard one contains only as many features as we could get to fit into an unexpanded QL. Both are fast and flexible, and very powerful indeed in the hands of the intelligent. Not a word processor, Editor's a way of life.

SPECIAL DESKTOP PUBLISHER
DESKTOP PUBLISHER

Both these WYSIWYG ("What You See Is What You Get" dtp systems are excellent in their own rights - it is only when you compare them with the stunning Professional Publisher that you become aware of their shortcomings. You won't get fonts as large or smooth as with PP, or wrap-around graphics, or as sophisticated a printer driver or text/graphics file import facility. You will get a very workmanlike tool, capable of producing output that the computer press described as fantastic and superb.... The standard edition is the ideal if you do not have a disk drive: if you do have one, go for the Special version, which correspondingly has more features including textures, large windows, better drawing and improved command entry. All upgrades are possible, and there is only a £10 penalty for doing it in two stages. So if you simply cannot afford PP, one of this pair is certainly for you.

SUPERFORTH COMPILER WITH REVERSI

Why not learn FORTH, the most logical computer language of all? This superb FORTH-83 compiler produces stand-alone multi-tasking code of speed comparable to C. **SUPERFORTH** source is even portable to other machines! The manual teaches you the language.

IDIS SPECIAL EDITION
IDIS

Machine code (from other people's programs, toolkits and the ROM) is unintelligible until you put it through IDIS, the intelligent disassembler. IDIS Special Edition automates everything it possibly can, and requires no human intervention. It even sorts out subroutines, replaces addresses with names, untangles data from code and so on. Standard IDIS contains as much as we could pack into an unexpanded machine, and is nearly as automatic.
If you want to find out how computers work, buy one of these two!

MONITOR

Check dynamic operation of programs - IDIS's ideal companion.

MICROBRIDGE

Never be short of a 4 for Bridge again. Superb bidding tutor included, based on random hands dealt with lightning speed. Manual a masterpiece.

SUPERCHARGE SPECIAL EDITION

If you have an unexpanded QL, or cannot afford Turbo, but want SuperBASIC programs to go faster, **Supercharge** is the answer. It has about half the speed of its big brother, is not as tolerant of badly-written programs, and lacks many of Turbo's features (like linking, program sizes >64K etc): nonetheless, it is the compiler about which we recieved over ONE HUNDRED happy letters from satisified users all using the word "Excellent" to describe it - and hundreds more who used other equally complimentary terms. The only gripe was about the Lenslok copy-protection, long since removed by us. So now **Supercharge** is wonderful....

SUPER SPRITE GENERATOR

SSG moves things about the screen rapidly, at machine code speed, directly from simple SuperBASIC. Any number of sprites (each with upto 16 frames for smooth realistic motion), 256 speeds, 256 planes, collision detection and dozens of special effects.

SUPER ASTROLOGER

A cut-down version of the Professional Astrologer - smaller horoscopes and manual, no interpretations for forecasting or compatibility testing. Still a marvellous buy at the price!

BETTER BASIC EXPERT SYSTEM

SuperBASIC is a super BASIC. If you want to improve your programs automatically, and learn as you do this, get **Better Basic**.

TRANSFER UTILITY

Copies files between devices, performing translates as it goes. Needs a ramdisk to run. Can move your microdrive material onto disk, so programs run from disk but you still have access to microdrives.

TERMS AND CONDITIONS)

* Our non-game programs are very comprehensively documented with A4 manuals averaging about seventy pages in length (the largest is 325+). They are 4-hole punched for easy binding and storage.
* UK purchasers - the quoted figures are all-inclusive. For the rest of Europe, add 5% (rest of the world, 10%) to the quoted figures to arrive at the VAT-free total (exports are zero-rated for UK VAT), inclusive of all freight and documentation charges.
* Acceptable forms of payment are sterling cheque drawn on a UK branch of a bank or building society, sterling postal order, Eurocheque made out in sterling, international money order in sterling, VISA / ACCESS / EUROCARD / MASTERCARD (specify expiry date), cash, foreign currency cheque (add 10% conversion charge), direct money transfer (write to us notifying us of the transfer, and ensure that all charges are paid your end, or add 5%) to A/C 50327808 DIGITAL PRECISION LTD at Barclays Bank PLC (Branch code 20-79-44), South Chingford Branch, 260-262 Chingford Mount Rd, London E4 8JN. We are very flexible, as you can see!
* To upgrade from one version of a program to a superior program, send us the cartridge/disk. Except in the case of upgrades between program versions both with the same name, send the manual too. The cost of an upgrade is £10 plus the difference in current advertised price between the two programs. So the upgrade from DIGITAL C to SPECIAL EDITION DIGITAL C costs £30, and you would need to return the old manual as the program names are different.
* Our programs are all user-transferable between cartridge and disk, are all free from ALL copy protection, and all work with all drives, toolkits, RAM add-ons and disk interfaces (except for early MCS interfaces, to which the emulators and media managers object). Users of the Microperipherals interface are recommended to buy the QFLP ROM upgrade from Care Electronics or Qjump. ST/QL Emulator owners will benefit from a c2.7x speed increase on all our products.
* If you want Eye-Q, but want to use it with a Gigamouse, with QRAM or on a THOR, specify your intended use with your order.
* Microcartridge users please note: don't panic! we have large stocks of microcartridges and we are NOT going to run out. Quality software on cartridge will continue to be available from us for the foreseeable future. You can buy cartridges from us at the rate of £19.95 for a set of five cartridges.
* Digital Precision (abbreviated by our admirers to DP!) is a trading name of DIGITAL PRECISION LIMITED, Company Registration No. 1833989, registered in England & Wales, VAT Reg. 420 1560 08.

PRICE LIST

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As PERFECTION is not a superior Editor version but instead is all new, it is not available at an upgrade price to Editor owners. However, Editor owners can claim a £5 reduction when ordering it.

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SOFTWARE

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QL SCENE

Birthday

In October the **QL and 68000 Group** in Birmingham celebrated its birthday party, and held a 3D graphic demonstration by Dave Barker and Robert Nash, with and without perspective. They can be contacted at **20 Widney Avenue, Selly Oak, Birmingham B29 6QE. Tel: 021 472 6671.**

Subs Draw

Maxwell Specialist Magazines congratulates the following winners of the MSM Subscription Renewal Draw:

J D Abercrombie (Surrey) wins £150

J Vallance (Glasgow) wins £50

GF Sainsbury (Essex) wins £50

Subscribers who renew will automatically have their names entered in the monthly renewal draw. You can renew at any time by calling the subs department on **091 510 2290.** Good luck!

Catalogue

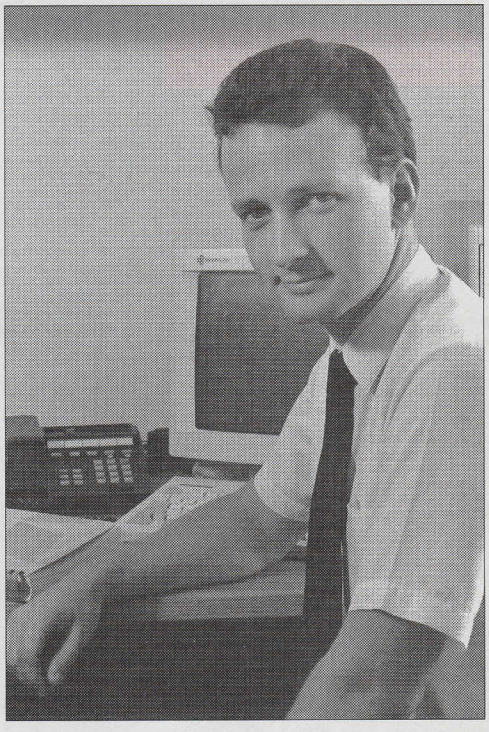
Greenweld Electronics' 1991 catalogue is now out, featuring an expanded range of loudspeakers and music section, more soldering equipment and tools, more semiconductors and leds, and more opportunities for bulk price discounts.

The catalogue can include the Bargain List pages and supplement, with follow up supplements for subscribers. The full package, including the 130-page catalogue, 16 page supplement and reply-paid envelope, costs £2.50. (Catalogue only, £1.50; free to industry and educational establishments.)

Orders to Greenweld Electronics Ltd (SQ), 27 Park Road, Southampton SO1 2TB. Tel: 0703 236363.

EEC HAVE THE WORKS

Bill Richardson, MD at EEC Ltd: "The best equipment for QLs."



Tony Phipps, the new business development man.

EEC Ltd, suppliers of hardware and software to the overall Sinclair market for the last six years, still have access to large stocks of QL (and Spectrum) products, including new, boxed QLs, disk drives, and microcassettes. The QLs come complete with the elusive User's Manual, and MD Bill Richardson tells QL World that he has some Manuals for sale individually.

The company is extending its activities by employing Tony Phipps as Business Development Manager with experience in helping individuals and businesses to implement PC systems.

"The objective of EEC is to see that people either start off with the right equipment or get better use of equipment they have acquired piecemeal, by recommending, and supplying where necessary, the best equipment for their application, be it hardware, peripherals or software," says Bill Richardson.

Contact EEC at 18-21 Misbourne House, Chiltern Hill, Chalfont St. Peter, Bucks SL9 8UE. Tel. 0753 888866.

Di-Ren go two-way

FT ComClub have announced 'the most important advance' in the upgrades to *Fleet Tactical Command:* FTC II will contain a two player on one machine option initiated by the SWAP or AUTO SWAP command on an expanded QL.

Publishers Di-Ren say that this is the best alternative to using two machines to get the most from the massive sea-tactic game. A computer versus player option would be a distinct possibility 'if we could afford to develop it' as a bolt-on to V.2.

FTC now definitely runs on the Amiga using a QL emulator. It was still unclear whether it is running on the ST although 'it should', according to Di-Ren.

Di-Ren's mini process controller, with a specification somewhat altered since its original announcement, will shortly be ready for review. Also in the pipeline is a low-cost QL-QL Network Prover, a hardware gadget which can be permanently installed in-line and carries an led indicator to show whether the network is working or seized.

For information contact **Di-Ren, 43 Davids Road, Forest Hill, London SE23 3EP. Tel: 081 291 3751.**

OPEN CHANNEL

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, 116/120 Goswell Road, London EC1V 7QD.

No heat

I have two QLs that I want to connect for networking. They are Spanish QLs with pre-D14 serial numbers. I have a Sandy SQ board on one of them, and I install TK2 in the other via mdvs. I can't make the net commands work in any way.

Can anybody help me? Is it a software problem or a hardware problem? Can it be arranged?

I often read about people who have problems with overheating, and usually read complicated answers that involve soldering inside the QL and so on. I have solved the problem in a cheap and easy way (if perhaps ugly) that works fine.

I have made a 12V power supply (*QL World* April 1989) and have bought a fan like a PC power supply fan. Then I made about twelve holes each about 3cm wide along the border of the mdv ports and fitted the fan on the plastic cover of the QL.

I have never had another unexpected crash. Obviously it is not a beautiful solution, then as I have said it is easy, cheap and not dangerous for your QL.

I would like to tell you about a trick that I found using Metacomco's C compiler. The manual explains that if you want to pass parameters to a C program (in the form of argv) you must have the rom installed, and use the commands GRUM, etc.

Well, you can pass parameters just like you used to do with normal machine or compiled programs, but with a comma preceding them, for example EX WRK_O_BIN;", %4096 10 QL". This will execute wrk_/o_bin using 4096 byts as working space and with argv(1)=10 and argv(2)=QL without the rom or any software installed.

Julian Colomina Gonzalez
Madrid
Spain

Rare mice

Mike Lloyd is right in characterising mice as being rare on the QL scene, but one might wonder why this is so, since essential software add-ons such as QPac 2 would benefit greatly from the use of a mouse. Atari-compatible mice can be bought everywhere at reasonable prices, so the real problem seems to be that the QIMI interface is no longer available – for no apparent reason. Several enquiries regarding the availability of a mouse interface for the QL produced no response: TK Computerware merely assured me I could use QPac 2 without a mouse (true) and Care didn't answer my letter at all. Can someone from QJump or Care explain why QIMI is no longer produced? Is there anyone out there who would sell me a QIMI/RTC?

On a different track, I would like to comment on the new *QL World* cover design. The new logo probably does its share of telling the world the QL is still alive (recently I saw a picture of a QL in the most unusual place, namely on a cover of a songbook containing pop songs of the 80s. Obviously it is thought of as being characteristic of that decade). Even so, it is a pity you have lost your brilliant cover artist Mark Taylor during the change of publishers. If his cover designs became available as posters or perhaps as a calendar, I would certainly buy it.

On a different track, may I say how great the Minerva rom is? Every self-respecting QL user should have one. The only problem I have come across so far is in running Mortville Manor, which seems to rely heavily on some quirks of the FILL command (it's still playable, though). If Minerva is fitted, the benefits of using Lightning SE are greatly diminished, and there is little point in buying it instead of the much cheaper Speedscreen.

Michael Hussmann
Hamburg
West Germany

Editor's comment: This letter naturally arrived before the new, new cover was unveiled. Various people have painted QL World covers in the past, and the cover of the ill-fated April 1990 issue was much admired. If we can reach enough new users through the news trade, we can stick with the artwork cover. Is anybody else interested in reprints of past cover artwork? Let us know if so, and what you would like to see.

Without presuming to offer any additional comments on the relative usefulness of Lightning SE and Speedscreen with the Minerva rom, my first reaction on seeing those three magna operes mentioned – knowing something of the personalities involved – was to dive under the desk and pull the chair in after me. On second thoughts, I shall be in Tibet for a fortnight.

However, we do now hear that some QL software faces difficulties with recent Minerva versions.

Cover line

I like the new cover design because it looks modern. However the November issue looks better than the previous two months.

J Wheatfield
Cardiff

Editor's notebook

As QL users are aware, there is the potential for building an advanced personal computer system at a comparatively low cost with the QL, and the hardware is available. We at *QL World* are compiling a guide to buying a QL system from scratch, the what, where and how. We hope it will appear next month. When it does, collar your non-user friends, and show it to them.

Next month's cover booklet will concentrate on Abacus and Easel. We will be following up the Archive booklet with an article on first steps in Archive programming.

A famous non-returnee this month – now almost as famous for its non-returning as for its many triumphs – is the Microdrive Exchange. The reasons mostly involve nobody being in the right place at the right time – everybody is up to their ears in the booklets. If ordering from old forms, please note that Sector are now back at 39 Wray Crescent, Ulnes Walton, Leyland, Lancs PR5 3NH.

Some people will have spotted Sector Software's ad last month for the 5th Northern Computer Show on Saturday 1 December. It has been recently confirmed at the **Stokes Hall, Church Road, Leyland, Lancs,** near M6 junction 28. Phone Sector on 0772 452414 for information and a map.

Thanks

I read in *Open Channel*, September 1990, that one of your readers had some problems printing from *Family Tree*.

Being a user of this program, I had the same problem and I solved it with the help of *Toolkit 2* incorporated in the Trump Card, where there is a screen dump facility.

To use this facility, it is necessary to insert the following lines at the beginning of the *Archive* boot:

```
100 TK2_EXT
110 PRT_USE ser, ser: SDP_SET 2,1,1,0: SDP_KEY p
```

Then, activating ALT P allows hard copy of a screen to be printed on a dot matrix printer.

Alex Toupy
Leige
France

Editor's comment: we have had other solutions and suggestions for obtaining screen dumps from Family Tree, and we are looking at them with a view to publishing one or two.

Buttons

I share the enthusiasm of Mike Lloyd for the QPAC2 (*QL World* August 1990): those puttons are real jewels; one selects and arranges them according to one's taste and need. Moreover, as Mike Lloyd writes, they are not so condescending as those icons, which take computer users for illiterates.

It is also nice to read the *QPAC2* manual; Tony Tebby takes us seriously, with some soupcon of British humour.

While it is true that the mice are rather rare in the QL World, I am among those happy few who have the *QL Emulator* on Atari ST sold by Jochen Merz. The QL Emulator on Atari ST (1 megabyte) plus Lightning plus QPAC2 plus The Editor (which reads everything) plus text87 (a versatile and sensitive text processor) plus a good *Archive* or *Archdev* application program are what I would call a personal computer. I recommend warmly this combination for those who write a lot.

Jusfiq Hadjar
Leiden
Netherlands

Listing 1: boot

```
 1 x=RESPR(17582):LBYTES mdv1_speedscreen_code,x:CALL x
 2 CLEAR:WINDOW 512,256,0,0:CSIZE 2,1:CLS
 3 AT 1,12:PRINT'LOADING QL QUILL':AT 3,13:PRINT'version 2.3++'
 4 AT 5,7:PRINT'copyright  C 1984 PSION LTD':AT 7,13:PRINT'word
   processor'
 5 DAT$=DATE$
 6 AT 9,13:PRINT DAT$(10TO 11);'.';DAT$(5TO 9);DAT$(1TO 4);"."
 7 IF DAT$(1TO 4)<1989
 8 INPUT "Set date ! ";s$
 9 SDATE s$(1TO 4),s$(6TO 7),s$(9TO 10),s$(12TO 13),s$(15TO 16),
   s$(18TO 19)
10 GO TO 2
11 END IF
12 IF PEEK_L(163872)/1024-256==512
13 CSIZE 2,0:AT 21,5:PRINT'(ram1_220 & ram2_220 FORMAT-ed)':CLOSE#2
   WINDOW#0,400,20,35,215
14 a=RESPR(2048):LBYTES mdv1_ram_cde,a:CALL a:FORMAT ram1_220:FORMAT
   ram2_220:CLOSE#1
15 END IF
16 ALTKEY 'f',CHR$(236)&CHR$(240)&'f'&CHR$(32)&CHR$(32),''
17 ALTKEY 'l',CHR$(240)&'l'&'?',''
18 ALTKEY 's',CHR$(240)&'s','','y',''
19 ALTKEY 'p',CHR$(240)&'p','','','',''
20 ALTKEY 'd',DAT$(10TO 11)&'.'&DAT$(5TO 9)&DAT$(1TO 4)&'.'
21 EXEC_W MDV1_QUILL
22 OPEN#1,scr:OPEN#2,scr:INK#1,7
23 DIR ram2_
24 INPUT#0,"'t' for transfer ('b' for boot) ";name$
25 IF name$="b":LRUN mdv1_boot_quil
26 IF name$="":STOP
27 WCOPY "ram2_","mdv2_"
28 GO TO 24
```

Listing 2: boot_quil

```
 1 CLEAR
 2 WINDOW 512,256,0,0:CSIZE 2,1:CLS
 3 AT 2,11:PRINT"LOADING QL QUILL"
 4 AT 4,13:PRINT"version +2.3"
 5 AT 6,6:PRINT"copyright  C 1984 PSION LTD"
 6 AT 8,12:PRINT"word processor"
 7 CLOSE#1:CLOSE#2:WINDOW#0,400,20,35,215
 8 EXEC_W MDV1_QUILL
 9 OPEN#1,scr:OPEN#2,scr:INK#1,7
10 DIR ram2_
11 INPUT#0,"'t' for transfer ('b' for boot) ";name$
12 IF name$="b":LRUN mdv1_boot_quil
13 IF name$="":STOP
14 WCOPY "ram2_","mdv2_"
15 GO TO 11
```

Listing 3: dir mdv1_

```
QUILL_2.3++
6/209 sectors
boot
boot_quil
QUILL
QUIL_HOB
install_dat
printer_dat
ram_cde
speedscreen_code
```

Long doc

This letter concerns the article "Long Quill" in February 1989 and Roger Smith's problem with long Quill documents. Mr Briggs' answer is not the only possible solution to the problem.

A possible brief answer could be:

First save your (long) document to a ramdisk. Then quit Quill and copy the file from ramdisk to microdrive. You will be surprised by the speed improvement.

If you want to re-enter Quill, type 'b' after file transfer, Quill will be booted on another way leaving the contents of the ramdisk unchanged. Then you can load the same document either from ramdisk or from microdrive. Loading from ramdisk is much faster.

Test report on a 10475-word document (over 8K):

load from mdv: c. 70 secs
load from ram: c. 6 secs
save to mdv: ages
save to ram: c. 15 secs
copy ram to mdv (with overwrite): c. 20 secs

The listings attached are: Listing one: my main boot program for Quill. As you can guess, I have Super Toolkit 2, 512K Expanderam and an (unreliable) battery clock attached.

Listing two (boot_quil) is the "after-main-boot" program for use to re-enter Quill after the file transfer.

"Listing three" is the Directory of my working Quill cartridge. Here you can find two additional files: speedscreen_code and ram_cde, both for speed improvement.

All the above make the QL and Quill very satisfactory and pleasant to use even without disk drives.

Boris Popovic
Sarajevo
Yugoslavia

Help!

Please could you help me? I have recently acquired a QL, only to find that the only package that will load is Easel. Quill, Abacus and Archive all produce the error message: "Line 8, bad or changed medium".

I have tried to solve this but have failed. The person whose machine it was did not make copies, and so I am stuck.

So please could you ask your readers if they have any copies of the aforementioned packages for sale or for me to make copies to mdv. I would be most grateful.

Michael Griffiths
2 Cwm Terrace
Cwm
Glyn Ebwy
Gwent NP3 6RR

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We have re-engineered the TRUMP CARD 768K to use the new 1 Megabit DRAM memory chips. This new design runs about 20% faster (twice the speed of the QL's internal RAM) and uses less power than the previous one (still available in the 256K size). It holds the same firmware:

- TOOLKIT II which comprises more than 100 additions and enhancements to the QL's Superbasic and operating system including an on-screen alarm clock, wild card copying, accessing remote devices on other QLs equipped with a ROM-based TOOLKIT II via the network.
- a printer buffer which can be used to buffer the serial ports (the size of which is limited only by the amount of free memory) letting you get on with something else whilst the printer is printing.
- a screen dump facility to copy all or part of the screen image to most types of dot-matrix printer including some colour ones.
- a RAM disk that allows you to access the memory as you would Microdrives or floppy disks for fast file retrieval (please note that RAM disk contents are lost after switch-off or reset).
- a memory cut that resets the QL to appear as an unexpanded 128K type for the few early programs that refuse to run in expanded memory.

The disk interface can access up to 4 disk drives (e.g. our DUAL 3.5" plus our 5.25") and has the same commands as are used for Microdrive control. There is an additional command FLP_USE which can be used to divert all MDV accesses to FLP (the floppy disk interface device name). This makes the transferring of your software from unprotected Microdrive (i.e. the majority of QL software including Quill, Abacus, Archive and Easel) to disk a trivial task. A simple step-by-step guide for transferring Quill as an example is given in the comprehensive TRUMP CARD USER MANUAL supplied with the TRUMP CARD.

The TRUMP CARD 768K's RAM adds to the QL's own 128K giving a total of 896K. Like the firmware the extra RAM is installed automatically when the QL is switched on so that no installation procedure is necessary. The exception to this is TOOLKIT II which can be left uninstalled for compatibility if you have other toolkits; installation consists of simply entering the command TK2_EXT.

Fitting the TRUMP CARD 768K is easy - you remove the door at the left hand end of the QL and slide the TRUMP CARD into the expansion port. A "Beginners Guide" on pages 3 and 4 of the TRUMP CARD USER MANUAL will quickly get the novice and experienced user up and running.

TRUMP CARD 768K PACKAGE

£375 inc. (£333 export)

TRUMP CARD 768K + dual disk drive + 10 diskettes

This is the ideal upgrade path from obsolete Microdrives. The package comprises the latest TRUMP CARD 768K plus a QL standard floppy disk drive with 2 mechanisms plus ten 3.5" double-sided double-density diskettes. The only extra item required is the appropriate mains plug to suit the country where it is to be used.

Disks are more reliable than Microdrives, hold much more information (720K after formatting) and are several times faster. Besides these advantages they actually cost less. Our QL DUAL DISK DRIVE is fully boxed in a black metal casing and is mains (220V-240V AC) powered.

An EXPANDERAM 512K can be used as part payment against the TRUMP CARD 768K PACKAGE. Just send it to us together with £285 (£255 for overseas customers) remittance and we will send you the TRUMP CARD 768K PACKAGE.

This package transforms the unexpanded QL into a very powerful machine and is very easy to fit. We are confident that you will find this investment more than worthwhile as many QL users have already done so. If you are not fully satisfied with your purchase then by returning it to us within 14 days of receiving it we will return your money in full.

When ordering by phone it is sometimes easier to spell names and addresses using the phonetic alphabet

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- ☆ Fully compatible with TRUMP CARD

We recommend that you consider purchasing the QL HARD DISK only if you have already upgraded to floppy disks (e.g. TRUMP CARD PACKAGE) so that backing up is practical. Also the QL HARD DISK uses about 55K of RAM leaving little room in an unexpanded QL for programs.

QL 5.25" DISK DRIVE £125 (£114)

- ☆ 360K capacity
- ☆ Ideal for Conqueror
- ☆ Through-con for dual 3.5"

This complete unit can be retrofitted to a TRUMP CARD PACKAGE so that Solution/Conqueror users can read PC diskettes. We recommend that Microdrive users upgrading to disks consider the QL-standard TRUMP CARD PACKAGE rather than the 5.25" drive.

(Needs disk interface e.g. TRUMP CARD)

QL DISK ADAPTOR - £15 (£15)

- ☆ Access 4 drives from TRUMP CARD
- ☆ Upgrade to latest TRUMP CARD ROM

Plug this into the original TRUMP CARD, install the latest ROM (included) and your TRUMP CARD can control up to 4 drives, e.g. our Double 3.5" plus 5.25".

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- ☆ SER1/SER2 to parallel printer
- ☆ Standard Centronics plug
- ☆ Default QL set-up 9600 baud
- ☆ 3 metre cable

Connecting a printer to the QL using this interface is not only simpler but is usually cheaper than buying a serial card for your printer plus a serial cable. Two interfaces will enable 2 printers to be driven simultaneously.

QL DISK CARD - £100 (£89)

- ☆ TRUMP CARD without RAM
- ☆ Full TOOLKIT II, etc.
- ☆ Controls up to 4 drives

The DISK CARD is intended for use with an internally expanded QL or with the EXPANDERAM.

QL DISK CARD PACKAGE £250 (£224)

DISK CARD Plus:

- ☆ DUAL 3.5", 720K DISK DRIVE
- ☆ 10 diskettes

QL EXPANDERAM 512K £99 (£88)

- ☆ Increases QL RAM to 640K
- ☆ Through connector for disk interface
- ☆ Plugs into the expansion port

If you already have a disk interface then the EXPANDERAM will slot in between the QL and the interface. Programs running in the EXPANDERAM run about 1.75 times faster than those in internal memory.

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- ☆ Fully cased complete unit
- ☆ QL-standard format
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(Needs disk interface e.g. TRUMP CARD)

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- ☆ Increases QL RAM to 384K
- ☆ Controls up to two drives
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- ☆ Can be expanded to 512K or 768K

Please note that we offer neither the parts nor the service for expansion.

QL TRUMP CARD 256K PACKAGE - £285 (£255)

TRUMP CARD 256K plus -

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Bryan Davies talks about printers and the virtues of QL desktop publishing progams.

While filing QL correspondence, I came across a couple of letters from female QL users, and it struck me that the impression we get from readers' letters is that the QL scene is predominantly male. Is this really true, or do the ladies complain less, have fewer problems, or have less to ask or complain about? The computing scene in general is far from being a male province, but it may be that the QL – being more of a "technical wonder" than, say, the Amstrad PCW – has more attraction for men than women. Reading PCW magazines, it is clear that there are many female users of that system, and they frequently send in articles about their own use of the system. The interaction between user and magazine seems appreciably different; while our readers tend to write in with technical queries, the Amstrad PCW readers seem inclined to put fingers to keyboard to describe what they do with (rather than to) their computer, usually in what could be called a "cottage industry" sense.

The launch advertising for the QL emphasised its suitability for business use, but it seems it ended up being more of a hobbyist's joy than a work tool. Such a comment may well produce some highly-critical letters, and I hasten to add that my own reason for buying the QL was for business purposes. If I understood correctly what was said in a recent write-up of an interview with Sir Clive, he was said to have lost interest in the QL when it looked as though it was attracting the writers of games programs, and that tends to confirm Sinclair had business use in mind when the QL was being developed.

No typewriter

Having spent many years working with computer systems (in the wider sense), there was no great novelty for me in having one at home, but it did (and does) seem a very good way of getting rid of the typewriter. The problem from the start was that it simply didn't do its job properly, and users were forced to become tinkerers, like it or not. Think back over the years – how many of you have spent more than 50% of the time with the QL on what you would call productive work? As the years went by, and Sinclair fixed the machine, the emphasis shifted, somewhat, from hardware problems to software ones, but the proportion of time spent getting the overall system to do what one wants changed very little. Well, take it from me that this state of affairs is not peculiar to the QL, and certainly applies (in my experience) in the PC world. *(And how . . . Editor and friends).*

PC problems

If you think you have had problems getting your dot-matrix printer to work with the QL, have a go at getting files set up for a dot-matrix printer to co-operate with a laser printer attached to a PC . . . we aren't so badly off.

That brings up a subject which has finally come into the open with the announcement by *Software*[87] of printer-drivers for *text*[87] to send output to the Hewlett-Packard LaserJet printer and its clones, and to the Epson GQ-5000. The bulk of common laser printers provide emulation of the HP LaserJet, so that driver should suit most users, but it was the GQ-5000 driver that attracted my attention first.

Coincidentally, I had just been offered that model of printer at a good price, and had finally broken down and decided to spend the money, even though I had no commercial justification for a laser printer at that moment (I was informed a week later that a laser printer was necessary to continue with certain current work!). For readers who have toyed with the idea of getting a laser printer, and ruled one out because of cost, it might be of interest to know that the price of the basic GQ-5000 (a short-period special offer from the supplier noted in the **Information** box) was £699 plus VAT. This is about half the Recommended Retail Price. It is a big step up from dot-matrix printer prices, but the improvement in print quality is even bigger.

You do have to bear in mind the extra costs that always seem to creep out of the woodwork, though. A basic laser printer has 512 KB of ram, and that should suffice for use with a WP program, but you need 1-1.5 MB to handle full pages of dense graphics (1 MB extra costs £198 + VAT for the GQ-5000). Some laser printers have a very limited set of founts and additional ones cost typically, £100-200 a set. The running costs are high, compared to those of a dmp printer. As with photocopiers, you need toner (£15 upwards, sufficient for 1000 pages or so), and even the drum needs changing (£100 upwards) at intervals, although most home users would not have to bother with that. Paper is roughly the same price as continuous stationery. Financially, laser printers only make sense to the home – or small business user if there are jobs to be done which require much higher quality output than a dmp can give.

For text, a daisywheel printer should give as good quality as a laser, but a daisywheel is no use for graphics, so you tend to come to the argument that a laser can only be justified where there is a substantial graphic content to the output, and that includes text which uses character sizes and styles that a dmp or daisywheel cannot manage. Basically, this means desktop publishing, or cad/cam applications. I hope to report on results with text[87] shortly.

The author of text[87] strongly recommends QL owners who are also Atari ST users to buy the QL Emulator for that computer. This is available from Jochen Merz in Germany, where there is apparently a strong group of QL users running text[87] on the emulator. As would be expected, performance is very much more sprightly than on the QL.

ST/QL Emulator

It is clearly debatable whether or not *QL World* should "encourage" readers to use computers other than the QL, but we would be sticking our heads in the sand if we tried to ignore a development as significant as the ST QL Emulator. By now, we should be able to consider this a mature product; it is several years since I first saw it (at a Microfair), and it was very impressive even then, in its early form. Apart from being comparable with the Thor XVI for speed, it is said to be stable running many of the standard QL programs.

There is other development work going on, notably at Miracle Systems, to produce something that can be added to an existing QL to make it "go faster", so there should be some choice of upgrades before too long. There is a very good selection of reasonably-priced, and professional, software for the QL; for users who want more speed, it makes good sense to stick with the QL software, and try to find ways of getting it to run faster.

By definition, speed is a relative thing. It

E SHOOTER

M S O L V E D

is quantified by comparing the motion of one object with that of another, which may be – notionally – "stood still", or going at zero speed. Can you safely say, for instance, that a computer which takes 1-2 minutes to load a reasonable-sized file is "fast"? Until recently, any computer with an 80386 cpu would be regarded as about the fastest the average home micro user could aspire to. Until recently I regarded my own 80286 machine as fast. It doesn't take much to upset the impression, though.

Standstill

In my case, it was reaching about 350 KB file size for a WP document, and somewhat less than that for a database file; the WP file just makes the computer look appreciably slower than it usually seems, but the database almost brings it to a standstill when recalculation of formulae takes place. A 386 machine should look faster with those same files, although it would depend very much on what "boosters" were in use, notably disk-caching routines.

However, what prompted this discourse was seeing one of the standard dtp programs – Ventura *Publisher* – running on a 386 machine. Talking while a file was being loaded, I literally forgot that loading was going on, because it took so long (and I understood the file to contain a 40-page document with graphics, whereas my 350 KB file held nearly 150 pages, with some simpler graphics too). Compared to my experience with the 286, this machine looked to be dead slow.

Not half

What I saw doesn't augur well for my future schedules, since I expect to use the same program before long. Even more disturbing is finding that, in a program costing not far short of a thousand pounds in its full version, the WP and graphics capability are distinctly limited, to the point that one would undoubtedly use other programs for these functions. I was given a demonstration of how to construct a "½" symbol, by piecing it together from the three individual parts, and then moving the 1 up and the 2 down. It was impressive that it could be done, but mind-boggling that the program apparently didn't already have this combination character in stock. The display unit and program alone had cost about £3,000; how much do you pay for a QL and *Professional Publisher?*

It would be helpful to receive some comment from readers who have used a hard disk with a QL. My enthusiasm for writing some helpful tips on setting a hard disk up was considerably dampened after a few days battle, and there is no sign of a breakthrough yet.

Readers' Letters

Welcome news for readers struggling to get money back from suppliers who have vanished from sight is the experience of **Derek W. Stewart**, who sent £195 to **ABC Electronik** in Germany for a Meta RAM, only to hear after several delays that the proprietor of that supplier had closed the business. With the aid of other QL users in the Quanta group, Stewart threatened to take action in a German Court and succeeded in getting back the £195. He is out-of-pocket for legal and cheque-translation costs, but is obviously happy to have got the bulk of his money back.

The latest information supplied about **Richard Alexander's** attempt to obtain a PS/2 keyboard from **Keyboard Products** is that one arrived a few days after he cancelled the order (by 'phone)! Apparently their advice in August that units were being shipped again was correct.

N.J. Harper and **Jacques Flury** have offered to contact David McCullagh and try to assist on the latter's Thor XVI problems. The main problem area looks to be the Argos operating system rom; from information supplied, it appears that version 6.34 is satisfactory, and 6.39 is the last-known "safe" version, 6.40 and 6.41 both having bugs in them. If anyone has obtained 6.42 (or 6.43?), please let me know how they perform (and how they can be obtained). Anyone using 6.40/6.41 and not having suffered serious problems so far would appear to be well advised to consider reverting to 6.34 or 6.39, especially if a large number of important files are kept on hard disk, because one of the reported problems is trashing all the hard disk files. It will not surprise Thor users to hear that my letter (sent several months ago) to Thor International requesting information on the Thor XVI has received no reply.

Another Thor XVI question was about connecting a printer. As I understand it, the machine has a standard 24-pin "D" (or, maybe, a Centronics 36-pin) Parallel connector, as used on PCs. Most printers can be plugged straight into that, since a parallel interface is almost invariably supplied in any printer that is used with microcomputers. A standard PC-to-printer cable would presumably be suitable for making the connection. There is also a Serial connector, but this is a DIN type, as opposed to the telephone-style connectors used on the QL. To enable a Miracle Serial-Parallel interface to be used, the standard connector would have to be removed from the interface and replaced by a DIN one. Flury has offered to supply McCullagh with the wiring details for this modification, and with an address for a supplier of the parallel-connection cable. In addition, he can supply the information for connecting a colour monitor to the Thor. While he feels the Thor XVI to be "a great computer", he is clearly far from impressed with the support provided by Dansoft/Thor International .

INFORMATION
Laser printers –
Epson GQ-5000 £699, Facit P6060 £669, both plus VAT & carriage:
SCS Computer Sales plc
24 Kingfisher Court
Hambridge Road
Newbury
Berks. RG14 5SJ.
Tel (0635)-529229

QL Emulator for the Atari ST £169 plus P & P (excl. VAT):
Jochen Merz Software
Im Stillen Winkel 12
4100 Duisberg 11
Germany.

Silicon Express

Mike Stevens has supplied a copy of the instructions for the Silicon Express disk interface, as requested by **F.M. Johnson**, and these have been passed on to the latter. The assistance given by readers in sorting out queries is much appreciated.

Apart from one complaint concerning supply, there has been no comment in my mail about the **Minerva ROM**. So far, it seems to be largely the "hacker" type of user that has purchased this alternative to the basic QL operating system, and there have been regular letters about it in the Quanta newsletter. As there have been several changes made to Minerva since it was first offered for sale, it would be interesting to have readers' opinions on the compatibility of the various versions with existing software.

Archive — QL at home PC in the Office

Bryan Davies carries his Archive about with him to use on the QL and the PC.

At present, the Psion Quartet is probably unique in being a commercial suite which can be obtained in similar versions both QL and PC form. For those users who have a QL at home and a PC in the office, this is an obvious attraction of the Psion programs; the chances are that the QL will have been played with more, and the PC may have been used for more business work, but there is likely to be some need, or desire, to do the same jobs on both machines, and the user will find working with the PC program versions basically the same as with the QL ones.

It would be pleasing to be able to say that all *Archive* files can be transferred between the two types of computer without requiring conversion work. Unfortunately, that's not so. Apart from the differences between QDOS and MS-DOS disk formats, the DBF and PRO file formats are not the same, and you have the usual confusion with non-text codes during the transfer process between machines.

This shouldn't stop the serious user from writing Procedures on the QL, at home in the evenings, then transferring them to (or typing them in on) the PC and running them on it, with the existing databases being transferred also. My involvement with Archive on the PC is too limited to give more than basic advice on working with the PC version, but I hope some users who have contemplated – but not pursued – the thought of moving Archive work back and forth between these two disparate types of computer will have another try after reading this.

Naturally, anything said about transfers between separate QL and PC computers applies equally to transfers between QDOS and MS-DOS areas of one QL when the *PC Conqueror* emulator program is being run; you can multi-task QL and PC versions of Archive this way and check that everything works satisfactorily, before you venture into the office to run new Procedures and databases on PC Archive there.

To avoid stoppages and confusion, try to rid your disks or sub-directories of file names which may be used during the transfer process. It is irritating to say the least to find you have overwritten another important file, or cannot make a copy, because a file with the desired name already exists. More likely is the uncertainty of not knowing whether the file you are dealing with is the one you think you have just created. If in doubt, rename any files which have names that you might want to use during the transfer.

Procedure files with the _PRG extension are text files and can be transferred using *XOver*, *MS-QLink*, or *DiscOver*. They will then load without further manipulation on the PC. Likewise, in the reverse direction, with .PRG files. You may have to make some changes; for example, DIR "RAM2_" is not going to make sense on a PC. Don't neglect the basic file difference – the use of the underscore (_) on the QL is equivalent to that of the dot (.) on the PC.

The BACKUP command is not used in PC Archive, being replaced by the COPY command. The latter still compresses the file by removing deleted records and unused spaces, so it is a command to be used at intervals to keep file sizes down. Warning of the absence of the BACKUP command in PC Archive is given by the appearance of procedures after a transfer; if the word "backup" appears in a procedure, the space after it is liable to have disappeared. The KILL command is available in PC Archive also, allowing you to delete an existing file, so that the COPY command can be used (COPY will not overwrite an existing file).

The MEMORY () function is not available, and you can't see how much ram is still available to the program. It is a good rule to put the TRACE function at the start of each procedure, to be able to see where something stops working; remove the TRACEs once everything works properly. In both QL and PC Archive, it is desirable to use the LOCATE command to find strings, since it is the fastest search command, but remember that it only works on a file that has been ORDERed beforehand, and on the first field of records. Two of the accompanying tables show how two procedures look (with TRACE not yet removed), when printed from the PC screen. They are essentially the same as when originally written in QL Archive, but note the use of COPY in the "StartN" procedure.

The third table shows the screen display when the same set of procedures is running. The text at top left is a directory of the ram disk used to hold the database file while the program is running, and the three lines at the bottom are the last two of a procedure called Choose, and the first one of the procedure menu called from that. The middle part of the display holds the information provided to the user, to enable a choice of function to be made. The upper part of this is purely information – the name of the database, the number of records in it, and explanations of what happens when the first letters of the menu choices are keyed.

The line beneath this information is the active menu; to emphasise the keys that have to be pressed, the first letters of the choices Look-Order-Test-Backup-Swap-Quit are in contrasting colours. While it may take a bit of time to tailor QL procedures to behave as required on the PC, the job is fairly straightforward and simple.

Files with the PRO extension are not straight text files, and cannot be transferred so easily. If you transfer a PRO file and use the LOAD OBJECT "PROGRAMFILE" command with it, you will be greeted with the message "wrong file type", but all you need to do is transfer the equivalent PRG file, then save it with the SAVE OBJECT command to create a PRO file. In case you have forgotten, a PRO file can be converted to a PRG one by LOADing it and using the SAVE "PROGRAM" command (as opposed to SAVE OBJECT "PROGRAM"), which automatically puts the PRG extension on.

The basic QL Archive cannot be used for this process if the _PRO file was created in *ArchDev*, but it doesn't seem to matter to PC Archive whether a PRG file originated from QL Archive, or ArchDev. _PRG files can be loaded into both Archive and ArchDev.

Most of the work goes into the DBF files, in the long run, and it is them the user will be most interested in transferring. As these files are not straight text (ascii) files in their DBF form, something has to be done to them before a transfer is attempted, and the obvious something is to Export them. A word of warning first; be very methodical in your actions, and follow the *User Guide* instructions on using commands if you are not too familiar with any of them. It is quite easy to either fail to transfer a file in sensible form, or to suc-

ceed without knowing how you did it, and neither result is satisfactory.

The first step on the QL is to set Archive (or ArchDev) running, without any procedures active. OPEN the _DBF file which is to be transferred. DISPLAY it to ensure that it is actually there, and open. Type-in EXPORT "DEV_FILENAME"; for speed you might want to use, say, RAM1 for the DEV, and the file name can be that which will be used on the PC, *without* any extension at this point.

CLOSE the open _DBF file; this is a step you might tend to forget, with possible disastrous consequences.

Check that you have indeed now got a file with the name FILENAME_EXP; preferably, check that it actually contains something, and is not just a 0-byte file. Start XOver (or whatever file-transfer program you use) and select QDOS-to-MSDOS transfer, and leave the program to convert the file to MS-DOS format and rename it FILENAME.EXP. Take the disk with this file to your PC, and start PC Archive running.

If you have done anything since starting PC Archive, play safe and type CLOSE several times, until the "File not open" message appears. The reason for this is that it is quite possible to go through the Import process and get a nonsense result, by having an existing .DBF file open at the time you do the Import. Instead of the desired file, the Import process then uses the other, open one, and creates something which is a partial copy of that.

Virtually every time I use Archive (on QL or PC), it convinces me it is "having me on" in some way; presumably, I am not doing exactly what it requires of me. On the other hand, there may be bugs in the program, and (like most human users) I am adept at doing the right things to wake bugs up.

So, type-in IMPORT "DEV_FILENAME" AS "FILENAME". If the transfer disk is in the drive you normally use for .DBF files, and you don't use sub-directories, there will be no need to put the DEV in. Where sub-directories are in use, it is perhaps best to copy the transfer file into the Archive sub-directory before trying to Import it.

One thing which must confuse many Archive users is the appearance of LOGICAL "" on the command line. This should not happen during the Import process as described, so if it does appear, you have done something wrong, like leaving another file open during the Import.

Even on a fast PC, all is likely to go quiet for some time after you press Enter on the Import command. Don't start pressing keys to get some action; leave it a while – several minutes if the file is anything other than tiny. You can check that the job is being done by watching the floppy (and hard) disk activity light, which should come on every now and then. You should now be in business, with a file FILENAME.DBF on your PC.

Type OPEN "FILENAME", then DISPLAY, to check that it is really there, and usable. As long as the screen shows the field format you expect from the file, it should be OK. Use the NEXT command if no data appears at first, as you may have a blank record at the start of the file. CLOSE the file and sit to think what you want to do next. The best thing to do is make a copy of the newly-imported database, before you do something wrong in the first flush of success!

Using Archive on a decent PC (eg an AT) is rather like using it on an Atari ST when the QL emulator is being used – it is appreciably faster than you have been used to. The extra speed is nice to have, but the big thing is that you don't need to make any big mental adjustments to use Archive (or *Quill*, *Abacus* and *Easel*) on the PC. The Psion programs are good ones, and quite adequate for most users. You can move files between the four of them, on both computers. If you use the XChange suite, you can switch between them, and have more than one copy of each available during a session. Like the QL, Archive and its mates will be with us for a long time yet.

Figure one

```
Bye       proc Start
Choose    trace
FindRec   print chr (12)
Menu      print chr (20) +chr (0) +chr (0) +chr (80) +chr (24)
PrintRec  ink 6
SafetyG   dir "F:"
SafetyN   let ins=0: let alt=0: let del=0
Start     print at 10,25; ink 2; "ADDRESS & PHONE LIST "; ink 6; "or ";
          ink 4; "GE
StartG    let k$=lower (get key ())
StartN    cls
Test      if k$="g": StartG: endif
Which     if k$="g": StartN: endif
          if k$<>"g" and k$<>"p":Start: endif
          endproc
```

Figure two

```
Bye       proc StartN
Choose    trace
FindRec   kill "f:temp.dbf"
Menu      copy "N" as "F:temp"
PrintRec  open "F:temp" logical "n"
SafetyG   order A$;a
SafetyN   Choose
Start     endproc
StartG
StartN
Test
Which
```

Figure three

```
SWAPAKLM.DV
SWAPAPGM.DV
TEMP.DBF
TEMP.1X1
TEMP.1X2
TEMP.1X3
TEMP.1X4
2020864 bytes total disk space
991232 bytes available on disk
                    ADDRESS & PHONE LIST
                    Records 269
                    L to add, change, look at or remove a record
                    O to put records in order
                    T to display records on screen, starting from the first
                    B to backup current database and then continue using it
                    S to swap alternative database for current one
                    Q to quit program
                    Look-Order-Test-Backup-Swap-Quit ?
6;"Q"; ink 2;"uit"; ink 6;" ? ";
Choose  :menu
Menu    :trace
```

SOFTWARE FILE

SPEEDFREAKS AND ASSAULT & BATTERY

INFORMATION
Program: *Speedfreaks; Assault & Battery*
Publisher: Kaos Software, 39 Calbourne Avenue, Hornchurch, Essex RM12 5BH.
Price (Each): £10 on 3.5in disk, £12 on MDV.

Rich Mellor finds that high-speed racing and blasting the foe can be fun in the comfort of your QL.

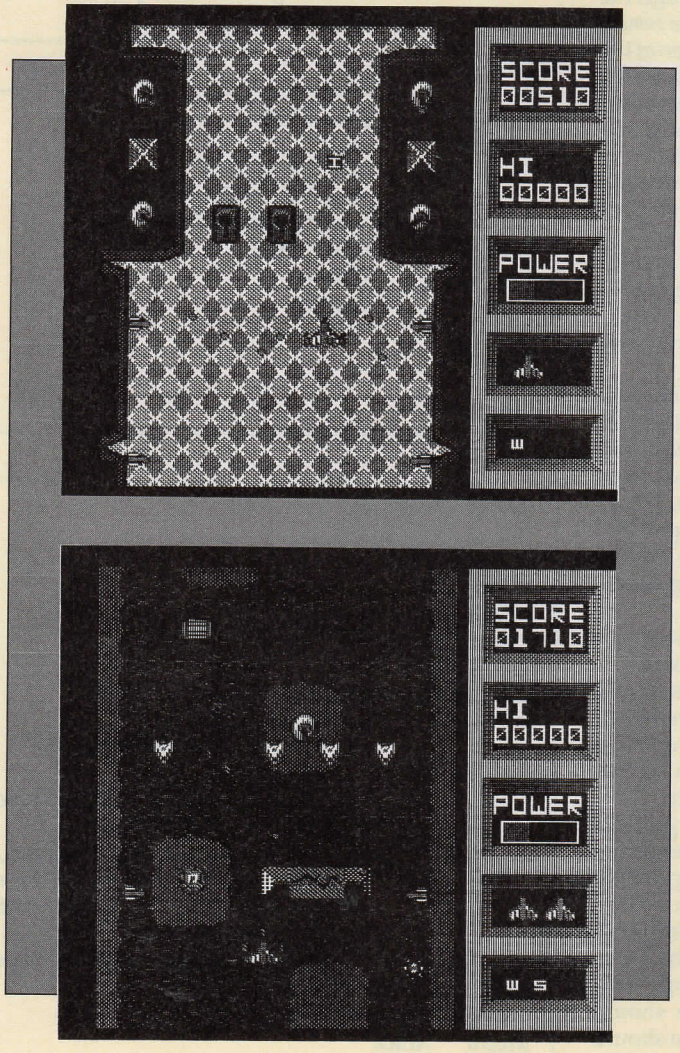
Since the QL was launched, there has been a positive dearth of good arcade games. These two are both rather late comers onto the QL scene, but go a long way to showing what the QL is capable of. Both games come with a single sheet of paper which is clearly presented and gives you instructions for loading the game and how to play it. The instructions are concise but more than adequate, and a program is included on the disk or cartridge to create a backup copy for your own use.

I cannot say that I was looking forward to *Assault & Battery* since I am not a great fan of games which entail going around and blasting everything in sight. However it is nice to know that I can be wrong, and I must admit that I was pretty well hooked after about three goes. Mind you, I was grateful that the copy I was sent for review had a button to make you invincible (this is not on the release version).

You are given control of a small spacecraft which has no other purpose in life but to relieve players of frustration by shooting everything in sight. A lot of thought has gone into making the game interesting; each level of the game leaves you flying your ship along different sets of canyons towards its ultimate enemy: a very large, powerful mothership. The route is hazardous in itself since besides the buildings which will damage you if you hit them, you also have to contend with rotating gun turrets, tanks, and cross-canyon guns. On higher levels the game is further complicated by even more types of enemy guns and planes. Once you reach the part of the canyon where the mothership is located, there is a short breathing space where only you and the mothership are on screen. Even on lower levels, the mothership can withstand quite a barrage of shells before it explodes. However, it fires its own shells in regular patterns (on higher levels it fires more shells in each burst) which enables you to get in quite close and keep on firing if you are careful.

To combat the defences in the canyons, your ship begins its journey with a single forward firing cannon and a fully powered shield. As the game progresses you will discover that upon destroying certain tanks, you are able to equip your ship with greater fire power, side-firing guns and even a limited duration invincibility! Your ship flies along at a moderate speed which enables you to do some planning as you fly, but it is essential to learn the location of the important tanks so that you can anticipate them and not have to wait until they have been destroyed before realising that you need to be on the other side of the screen. To make the game even more difficult, the tanks and planes move down the screen ahead of the landscape; while some guns slide up and down the canyon walls at the bottom of the screen. It is thus necessary to destroy most things before you overtake them, since once they are behind you there is no way back to them, which means that you can be fired upon from below.

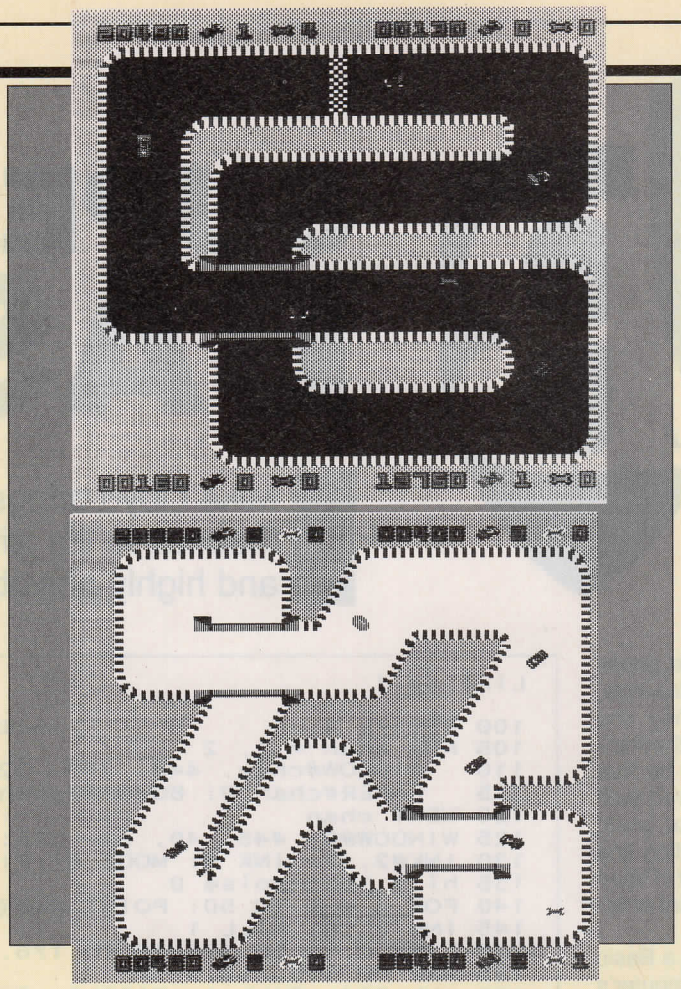
Although you are given three lives, it is nice to know that you do not lose one of them as soon as you are hit by a flying bullet, or fly into a building. Instead this will reduce the power of your shields. Once this reaches zero, you lose one of your lives. This power can then be restored by flying through one of the power lines which the enemy have thoughtfully strung out across the canyon here and there (although these can sometimes be quite heavily defended). Also in the game's favour, the different sets of canyons are split into sections so that when you do lose a life you are only returned to the start of the section, rather than having to start the level all over again. The ship is easily controlled by joystick or by keyboard, using the cursor



keys and space bar to fire. You can move your ship further up the screen to avoid some of the obstacles, and then move it back down to the bottom once out of danger to increase the available reaction time. Movement around the screen is smooth and responds well to the keys without any obvious overrun.

Much thought has obviously been given to the screen presentation, since the overhead view of the action is very clear and never seems to get confused. Limited ranges in the different types of guns also help to reduce the number of moving objects on the screen. As the screen scrolls downwards towards you, the scrolling is very smooth and you do not notice the printing of the terrain in front of you thus giving a more realistic feel.

The game is an excellent test of your reflexes and should please all of those players who have been out in an arcade desert on the QL for so long.



Speedfreaks is another new arcade game for the standard sinclair QL written by Damon Chaplin. It provides a nice break from the shoot-em-up *Assault & Battery* in that this is a leisurely car race. Okay; there have been other car racing games in the past, so what's new? This car race is different in that it is presented in 2D as a downward view of the race track (there are eight different race tracks). There are four cars on the race track which can be controlled by up to three players (hence the need to show the track as an overhead view); with any remaining cars controlled by the computer to form some sort of opposition.

To start with you are each given a similar racing car and have an equal chance of winning on each track. If three players are involved, you will need to use two joysticks and the keyboard to enable multiple control (although two players can use the keyboard if you prefer by using cursor keys instead of a joystick in CTL1, even though the manual doesn't mention this). In either case, joystick or keyboard provide the same amount of response to controls meaning that no-one should be at a disadvantage. The cars are easily controlled since only three buttons are needed (turn clockwise, turn anticlockwise and accelerate), which means that complex finger movements cannot detract from the game. To de-celerate, simply take your finger off the accelerator, just like a real car.

The circuits are each made up of Armco barriers alongside a nice clear track. Driving into a trackside barrier can have several effects as in real life. It can slow your car down (or even stop it), cause your car to explode in a mass of flames, or just make your car spin off it. The closer you drive to the edge the more difficult it becomes to control the car, but to achieve maximum racing speed you must do so, to make cornering much easier. Thankfully, even if your car is completely destroyed, you are not forced out of the game. Instead, after a short breathing space, you are given a new car near to the point of impact and you can therefore continue and try to catch up the other competitors

Each track contains the usual hairpin bends and some long straights which enable you to build up quite a speed; which inevitably leads to your downfall. However, on top of this lie other more dangerous hazards: oil, sand, water and whirlwinds which may cause you to skid or to slow down. Thankfully there is no need to try and avoid the other cars on the track (there are already enough obstacles) since you will merely glide over the top of them - it is nice to see that this does not actually interfere with the graphics! Another nice touch is that some of the race tracks include bridges where they cross over themselves. The problem here is that since the view is from overhead, when your car passes under the bridge you lose sight of where it is going and tend to unfortunately hear the sound of a crash as you try to get your car out. Still, it all adds to the fun and certainly makes the game much more skilful.

A race lasts four laps of the circuit, after which the average time taken to complete one circuit and the fastest times are given for each of the four cars (in case you beat the lap record). If the computer manages to win the race, which it often does on the more difficult race tracks, the game ends and you may be able to enter your initials into a high score table. However, if one of the players beats the computer you can carry on racing on another track with even more obstacles.

To help you on the harder tracks, at the end of a race you can add extra power, traction or speed to your racing car to set it up as you would like it. To be able to do this you must collect the spanners which appear at regular intervals upon the track. It costs four spanners for each improvement to the car, and each characteristic can be increased up to a maximum of five times. This means that the game is taken beyond the realms of a mindless speed game since it also takes quite some thought and planning to discover which are the best things to alter at which time.

Damon has done an excellent job of getting the games to run on a standard QL, but unfortunately due to the way the games work, there is no way to return to Basic or indeed to multitask, since everything else is locked out from the QL. The graphics used in both games are truly excellent (for the QL) and provide really smooth scrolling and movement. The pace of both games is pretty fast and furious, but is not too quick so as to be impossible, thus making the two games highly addictive. The sound makes the most of the QL's limited BEEP function, but you can always turn this off if it becomes too annoying. In all both games are a truly excellent buy, representing excellent value for money. It is a pity that software of this quality was not around earlier in the QL's life; let us hope that Damon will stay with the QL.

I do however have one or two small comments: I understand that the copy protection used will be removed from future copies of the games (once current ones have been sold). Unfortunately, the games are not *Minerva* compatible (although they work fine on all of the other QL roms) since they move the Stack pointer, meaning that Minerva cannot find the start address of the system variables. This may be fixed in a future version, but at the moment, it can lead to either a lock-up, or the loss of sound. Now that microdrives have come back down in price it is possible that Damon will reduce the microdrive version back to £10 - write to Kaos Software for details.

SUPER BASIC

Mike Lloyd brings arcade game theories to life with an original and highly playable game of skill.

Everyone puts down arcade games written in Basic. They are too slow, they are too simple, they use unattractive screens, and they lack originality. All these things may be true when Basic games are compared with machine code equivalents, but great pleasure can be gained from writing and playing Basic games and the best of them bear comparison with commercial offerings.

The first rule when developing a Basic arcade game is to play to the computer's strengths. On Sinclair Spectrums, for instance, there is a simple method of determining the character printed at a given location on the screen: this is extremely useful if your missile is at location 10,14 and you can test to see if an alien spaceship has been printed at location 9,14. The QL has no such equivalent because characters can be printed at any pixel co-ordinate and once printed the QL loses track of what it has placed where. It is possible to add extra code to a QL game to emulate the Spectrum in this respect, but it is probably not worth the effort. It is far better to use a different technique altogether to take advantage of the QL's greater flexibility in character positioning rather than moan about its lack of a particular function.

The next most important consideration is the type of skill required of the game player. This factor is closely linked to the scenario in which the game is set. If the objective is to shoot targets, then the scenario might involve space stations and alien hordes, if the objective is to avoid being hit then the scenario might be a maze occupied by ghosts, and so on. When games are reduced to their abstract level there is often little in the game play itself which separates them: it is the design of the screen and the description of the events which makes them distinctive.

The most frequently-used skill in arcade games is making two objects touch. This was required by that ancestor of the computer arcades, the bat and ball game, or tv tennis, as it was known to home users. Surprisingly, this game's moment of fame is now so long ago that it may need describing to younger readers. A small square represented a ball and one or two short lines represented bats. The ball 'bounced' off the bats and the 'side walls' of the screen. The bats were controlled with a left and right button. That was it; no background graphics, no hall of fame, and no ear-piercing sampled sound effects. And people actually paid to play the game in pubs!

Apart from the perennial 'Breakout' format (where the ball knocks bricks from a series of walls) the bat and ball scenario has not been much developed. When hitting objects directly became too easy the next step was to fire a projectile which hit moving targets; the famous Space Invaders game.

The design of *Space Invaders* reveals

Listing 1

```
100 REMark >                    Initialise the Screen
105 FOR chan = 1, 2
110   WINDOW#chan, 448, 200, 32, 16
115   PAPER#chan,0: BORDER#chan, 1, 4
120 NEXT chan
125 WINDOW#0, 448, 40, 32, 216: PAPER#0, 0
130 INK#2, 7: INK 6: MODE 8: FILL 0: PAPER 2, 0
135 hi = 100: noise 0
140 FOR n = 1 TO 50: POINT RND(180), RND(100)
145 INK 2, 0: FILL 1
150 LINE 0,10 TO 176,10 TO 176,0 TO 0,0 TO 0,10
155 ARC TO 176, 10, -.7
160 INK 204: FILL 1: CIRCLE  24, 80,  6
165 INK 203: FILL 1: CIRCLE 124, 86, 22
170 FILL 0: INK 7: CSIZE 2, 1: OVER -1
175 BORDER#0, 1, 2: CLS#0
180 BLOCK#0, 172, 34,   4, 2, 98
185 BLOCK#0, 256, 34, 184, 2, 98
190 BORDER#0, 4: BEEP
199 PAUSE
```

Listing 2

```
200 REMark >                                  Main Loop
205 REPeat main
210   INK#0, 2
215   AT#0, 0,  0: PRINT#0; "Score"\FILL$(" ", 5)
220   AT#0, 0,  6: PRINT#0, "Hi Score"
225   AT#0, 1,  6: PRINT#0, FILL$(" ", 9)
230   AT#0, 0, 15: PRINT#0; "LIVES :"
235   AT#0, 2, 15: PRINT#0; "LASER :"
240   pts = 0: power = 80: lives = 5
245   xps = 0: yps = 200
250   xx = 86: CURSOR xx-3, 10, 0, 0
255   INK#0, 5: scorex
260   a$ = "SPACE MARAUDERS ..."
265   a$ = a$ & "LEFT "  & CHR$(188) & "..."
270   a$ = a$ & "RIGHT " & CHR$(189) & "..."
275   a$ = a$ & "FIRE  = space bar ..."
280   display a$
285   REMark game_loop
```

```
Listing 3

300 REMark >                    Closing Sequence
305   BEEP: noise 4
310   CIRCLE xps, yps, (100-yps)/10, .5, 1.6
315   a$ = "game over..."
320   SELect ON pts
325     = 0 TO 100
330       a$ = a$ & "you need the practice..."
335     = 100 TO hi
340       a$ = a$ & "you know enough to be dangerous...
345     = hi TO 30000
350       a$ = a$ & "new high score ... "
355       hi = pts
360   END SELect
365   CSIZE 2, 1: BEEP: display a$
370 END REPeat main


Listing 4

400 DEFine PROCedure scorex
405   IF power > 110
410     lives = lives +1: power = 80: noise 4
415     wow 'EXTRA LIFE!'
420   END IF
425   IF lives >10
430     pts = pts +100: lives = 10: noise 4
435     wow 'BONUS SCORE'
440   END IF
445   AT#0, 1, 5-LEN(pts): PRINT#0, pts
450   AT#0, 1, 14-LEN(hi): PRINT#0, hi
455   AT#0, 0, 23
460   PRINT#0, FILL$(CHR$(162), lives)
465   CLS#0, 4
470   AT#0, 2, 23
475   PRINT#0, FILL$(CHR$(185), power/10)
480   CLS#0, 4
485 END DEFine scorex
```

clearly the grid nature of the screen: the aliens move from side-to-side or step downwards, the lasers and bombs move vertically and the gun platform moves horizontally. Where possible whole groups of Invaders are moved simultaneously in order to keep the speed of the game up. The direct successor to Space Invaders, *Galaxians,* introduced considerable variation to the across-and-down format without adding much to the processing requirements of the program. Galaxian aliens can move more independently and they dive at angles to the vertical, but they still occupy a two-dimensional universe.

The development of *Pac-Man* marked a radical departure from the shoot-em-up format which was becoming unoriginal and was being criticised for its dubiously xenophobic morality. Pac-Man turned the tables on the hunter-player and made him the hunted. Usually unarmed, he wandered a haunted maze avoiding ghosts and eating power pills, which seemed to be a much more morally defensible way to pass the time.

Pac-Man was developed at roughly the same time as *Frogger,* where you attempted to weave between lines of traffic moving at different speeds. This game is remarkable for the way its scenario camouflages what is an incredibly simple concept from a programmer's standpoint.

The maze idea first used by Pac-Man was taken to new heights by the famous *Manic Miner* game originally released for the Spectrum. The maze was not only populated by deadly and whacky life forms but it was itself alive and often dangerous, with its high walls, death-defying leaps and conveyor belts. Able only to move left, right and jump, the eponymous Manic Miner was even more vulnerable than Pac-Man, but his world was more imaginative, more varied and more satisfying than anything seen previously.

For *Space Marauders,* our Superb Basic arcade game, I wanted to take maximum advantage of the QL's strengths and to move away from the two-dimensional grids on which other games are based. The skill required in the game is of the traditional sharp-shooting variety, but with a couple of slight twists. Most games players are skilled at aiming at targets moving directly towards them or horizontally across the screen, because that is how most targets present themselves. To make things a little more difficult the targets in *Space Marauders* sweep across the screen in huge parabolas in a manner never seen on 8-bit computers. If the player permits, the targets can actually swing behind the gun platform and re-emerge to renew their attack.

The game's speed is kept up by reducing the number of moving elements to two: a gun platform controlled by the player and a target. When the gun is fired a laser beam is projected onto the screen. This can be displayed instantaneously, whereas a missile would form a third moving element and would complicate the program enormously.

The gun platform uses a standard QL character – printed by pressing CTRL SHIFT B which can be replaced by a user-defined character if desired. The character-definition routine printed in a previous Super Basic article could quickly be added to the game in order to achieve this.

It was decided not to portray the target using a character in order to achieve a three-dimensional effect by drawing a target which increases in size as it nears the bottom of the screen. The QL is not the fastest-drawing machine on the market and so the design of the target had to be kept simple. After a few experiments an ellipse proved to be the most acceptable graphic.

Having decided upon a game plan, which is basically a gun firing laser beams at elliptically-shaped targets following a "three-dimensional" path, the elements had to be worked into a scenario to give the game some credibility. Disliking the xenophobia of most shoot-em-up games ('they are only aliens, so it's alright to kill them') and stuck with a target design which looks nothing like a spaceship, I decided that the challenge was being presented by a natural phenomenon, a ring of pure energy in orbit between three planets. If the energy ring is destroyed by the gun platform the forces released can be put to good use, but if the energy ring comes too close to the gun platform it destroys it. The full scenario is printed next month.

The layout of the program is quite simple, as Basic arcade games must be in order to maximise performance. The first three listings form the main program, which initialises the screen, presents an opening display and instructions, calls the procedure which plays the game itself, and finally controls the end-of-game sequence. Supporting this part of the program there are procedures for making noises, displaying the score and making the display of information more attractive.

The game loop which lies at the heart of any arcade game is given its own procedure which will be listed next month, along with the four subordinate procedures which support it. The golden rule of not calling procedures at speed-critical parts of the game loop is strictly observed: the subordinate procedures are only called when the game pauses momentarily, to register a hit on the gun platform or the energy ring, for instance. Full details will be published next month.

The screen design needs to quickly

```
Listing 5

500 DEFine PROCedure noise (x)
505   SELect ON x
510     = 0: BEEP -1, 100, 255, 2000, 10, 4,6,15
515     = 1: BEEP -1, 50, 62, 4000, 4
520     = 2: BEEP 5000, 10, 200, 400, 50, 10, 6
525     = 3: BEEP 2000, 1, 10, yps, 30
530     = 4: BEEP 30000, 1, 10, 400, 30
535     = 5: BEEP 500, 30, 40, 50, 60
540     = 6: BEEP -1, 100, 3, 500, 200, 2, 12,10
545   END SELect
550 END DEFine noise


Listing 6

600 DEFine PROCedure display (word$)
605   word$ = FILL$(" ",9) & word$
610   PAPER#2, 203: INK#2, 6
615   AT#2, 0, 25: PRINT#2, "Press"
620   AT#2, 1, 25: PRINT#2, "ENTER"
625   INK#2,7
630   REPeat show
635     IF CODE(INKEY$(2)) = 10: EXIT show
640     AT#2, 3, 23: PRINT#2; word$(1 TO 9)
645     word$ = word$(2 TO) & word$(1)
650   END REPeat show
655   AT#2, 3, 23: PRINT#2, FILL$(" ", 9)
660   FOR x = 0, 1
665     AT#2, x, 25: PRINT#2, FILL$(" ", 5)
670   END FOR x
675   PAPER#2, 1
680 END DEFine display
```

evoke a cosmic scene with the three adjacent planets clearly visible and an overall impression of depth. **Listing 1** places the QL in 8-colour mode and establishes the windows for the space scene and for the information panel situated beneath it. Many games sent in to the *Microdrive Exchange* forget this simple preliminary because the programmers assume that because they always press F2 on start-up, all QL users do the same. This is frustrating to monitor owners who habitually use F1 to boot the QL.

The initialisation must also set up essential variables. Many of these are reset with each game and so are declared in **Listing 2,** but the highest score value is declared in Listing 1 and set to 100. For the next part of the screen-drawing sequence sound effects are requested from the Noise procedure (at Listing 5). 50 distant stars are produced using the POINT command with random parameters. The three planets are next to be drawn. The QL's valuable FILL command is used with two CIRCLE commands to produce two of the planets. The third is the one above which the gun platform is orbiting, so only an arc is visible.

The final task of the initialisation routine is to draw the background to the information panel. Horizontal red and yellow stripes add a touch of colour to the screen.

For each game, a preparatory sequence lists the controls used by the player, displays information in the control panel and initialises variables. The commands which achieve all this are in Listing 2. The roles of the variables are as follows:

pts	Number of points scored
power	Range of the laser beam
lives	Number of lives remaining
xps}	
yps}	The co-ordinates of the target
xx	The horizontal co-ordinate of the gun

The xx variable is put to immediate use in the CURSOR command which locates the next print position for the gun character. CURSOR is one of those commands whose syntax was never fully completed in the life of the QL and owners of early QL roms may find it necessary to change all CURSOR commands from:

```
CURSOR XX-3, 10, 0, 0
```

to:

```
CURSOR #1, XX-3, 10, 0
```

The *Scorex* routine called in Line 255 updates the rather complex relationships between hitting energy rings, gaining laser power and earning additional lives. Finally, a long text string is composed from the game's name and basic instructions. The text string is passed to the *Display* procedure for action.

The final command in Listing 2 calls the Game_Loop procedure in which the commands for running the game are listed. This procedure, and those which support it, are dealt with next month. When the player completes a game, control returns to the main program which continues in **Listing 3.**

The closing sequence tidies up by silencing the QL buzzer and by overwriting the energy ring one more time to remove it from the screen. The text which is displayed depends upon the score achieved during the game, and is governed by the SELect structure beginning at Line 320.

The first of the supporting procedures is at **Listing 4** and it handles part of the scoring routine. Points are awarded, and the laser beam's power is increased, for each energy ring hit. The laser beam's range is reduced each time it is fired. These aspects are managed in the main game loop. Scorex takes over when the player amasses sufficient points to merit an extra life. If the laser beam power exceeds 100 then an additional life is added and the laser beam strength is slightly reduced. Players cannot gain more than 10 lives: their laser power is converted to a points bonus instead. This rule is designed to ensure that the game will eventually finish. Incidentally, the *wow* routine mentioned in the listing will be published next month.

After handling exceptional scores, the Scorex routine updates the information display panel at the bottom of the screen. The current score and previous high score are printed on the left of the panel while the number of lives is represented by gun characters and the laser strength by chevrons on the right side of the panel.

Listing 5 contains a selection of useful noises to accompany all manner of space games. There is a single parameter which is checked by the SELect structure. Three of the sounds are permanent and can only be stopped by issuing a BEEP comand. Not all of them are used in this particular game, but I always include the whole procedure as a standard addition to all arcade games so that I can select different sound effects as best fit the circumstances.

Listing 6 scrolls text across one of the planets. The text passed to the procedure is padded with nine spaces and then a repeat loop is set going which prints the first nine characters of the text, following which the first letter of the text string is removed and placed at the end of the string. The result looks exactly like continuously scrolling text. The trick here is to choose the right number of characters to be displayed at one time. If there are too few it is difficult to read the text, but if there are too many the QL takes so long to print each line that the illusion of scrolling is lost.

If you are impatient to see what the listings so far published produce, comment out the call to the Game_Loop procedure using a REM command and run the program. The planets and stars will be drawn, followed by the information panel and the scrolling instructions. When the Enter key is pressed the program will drop directly into the closing sequence.

SOFTWARE FILE

GOBLIN'S QUEST

Rich Mellor finds a key or three.

This is a brand new arcade-adventure game similar in style to *Atic Atac* on the Spectrum. You guide a little goblin around over 30 different rooms within a haunted house in search of the key to the front door so that you can escape. Unfortunately, to make things more difficult, the key was broken into three pieces, all of which must be found and put into the right order before the front door will open.

When the game first loads, you are given the option of playing the game, watching a demonstration, or reading the instructions. Unfortunately, choosing the instructions (which are in excellent English despite the game's foreign origin) shows that they were written on a monitor and so not many tv users will be able to see all of the words. This did not bode well for the rest of the game since I only have a tv, but I was glad to see that this is the only part of the screen display which could cause tv users problems. Indeed the screen display of the rest of the game is very well laid out and clearly presented without any need for a monitor.

During the game, a large graphical representation of your goblin is shown on the right hand side of the screen. As your health and energy deteriorates, this will slowly change to a skeleton, but do not worry, since scattered all over the rooms, you will find food and drink, as well as different magical scrolls which will affect your health to some extent. Of these, the blue scroll is the most useful since it will return your health and energy to 100%.

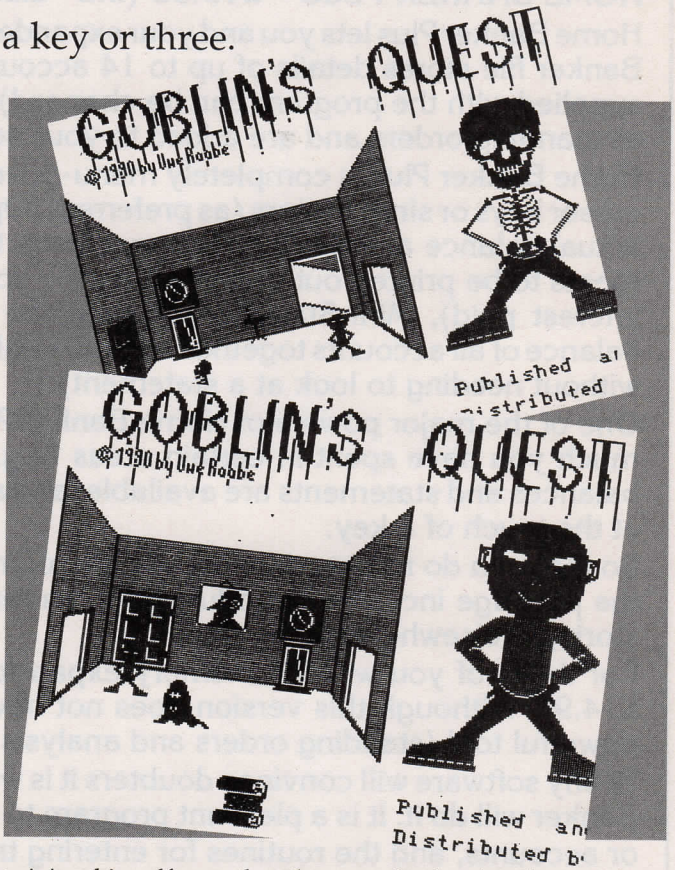
The rooms are each presented in 3D, with several doors leading off them which may be open or locked. There are three different keys around the house which will help you get around, each one a different colour to match the door they open.

Control of the goblin is very simple, since he is controlled using the cursor keys (pressing two at the same time allows diagonal movement), and responds very quickly to changes in direction. Objects are laid down upon various pieces of furniture. To find out if anything is on a piece of furniture, you simply stand in front of it and press the up key. You are allowed to carry a maximum of three objects at a time, so it is necessary to learn which objects are the most useful and leave the others somewhere you can get them quickly if necessary. Obviously the most useful objects when you start are the different keys, since much of the early part of the game will be spent opening doors to enable you to get into all of the house.

If you want to eat something or use something against an enemy, pressing space will use one of the things which you are carrying. If you are carrying more than one thing which can be used, the one nearest the left will be used first, so it is also important to sort out the order of the objects you are carrying.

Just so that it is not too easy; each room contains different monsters and ghouls which will drain your energy should you come into contact with them. Generally there is a powerful monster at floor level; and several flying things which will dive bomb you, taking little bites of your energy, and destroying themselves in the process.

Thankfully different weapons are lying around the rooms, such as maces, swords and axes which will help you to kill the ground-level monsters; who will not re-appear once killed. However, you are warned that the goblin cannot handle some weapons very well and is likely to injure himself more than the monsters.



Despite the amount of action on screen, the display is excellent; although I was disappointed that the ground level monsters become invisible on screen if you are too close, due to collision of sprites. Another minor flaw was that once or twice, after killing a monster, part of the goblin was left on screen. However, these minor criticisms apart, the graphics are really excellent and help to make the game highly addictive.

The action is quite fast and furious, although for those quieter moments, some of the rooms contain chairs where you can sit down and have a bit of a rest. Another option would of course be to commit suicide by pressing the ESC key; which is necessary since some rooms are dead ends unless you have the requisite key to open the door.

It was nice to see that there is an inexhaustible supply of food, since what was an empty table last time you passed, may now have a glass of beer, a piece of meat or something else to keep you going.

In all the game is excellent and well worth the money. It should provide many hours of entertainment, especially since the objects do not always appear in the same places.

INFORMATION
Program: Goblin's Quest
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SOFTWARE FILE

John Shaw learns how to crash dive to safety in six easy steps

INFORMATION
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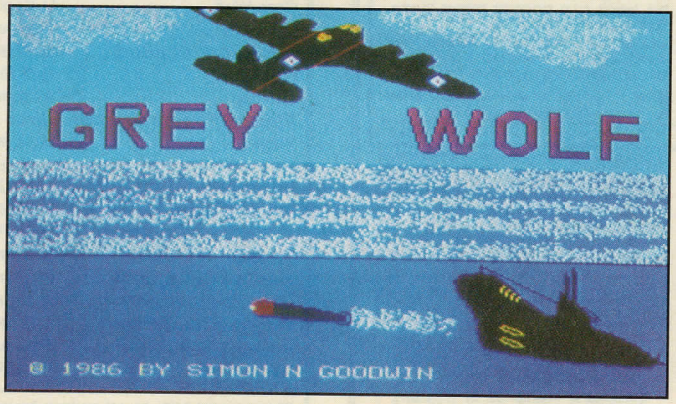
Price: £9.00 disk or £12.00 for two mdvs.



If ever they decide to make an award for the best contribution to graphics and sound on the QL then without any doubt it should go to Oliver Neef from West Germany. He certainly has talent and this program demonstrates it to its fullest extent.

Grey Wolf is a simulation of a German World War II type 7 submarine. It has a maximum speed of 17 knots on the surface and 7 knots under the water. The armaments are 14 torpedoes.

You are set as the Captain of the ship and your job is to sink Allied shipping in a very well protected area of the North Atlantic. Once you are on the surface you immediately become prey to RAF Costal Command; 50 metres beneath the waves you are safe.

The scenario is divided between three graphic screens, all of which are a delight to behold.

a. The Chartroom display.
b. The Navigating Bridge.
c. The Periscope view.

The chartroom gives the overall view of the area of ocean you patrol, together with a display of the relative positions of the enemy ships and yourself. You can then flip to the Bridge display to set a speed and course in an endeavour to intercept your target. Your progress across the sea is then automatically updated on the chart.

When you come within 10 nautical miles of the enemy your sound instruments give you a bearing to follow in order to reach him.

As you approach for the kill, a change to the periscope view shows the sea around you and the ship you are about to sink. When you are close enough and aligned correctly you just press a button and watch the torpedo rush across the waters to send the enemy to the bottom. Simple eh? Well no, there are one or two little problems to overcome.

The first one I have already mentioned, the anti-submarine aircraft. True you are given audible and visible warning of its approach but then you have to go through the crash dive procedure:

1. Lower periscope.
2. Close torpedo tube flaps.
3. Close air intake vents.
4. Set hydroplanes to dive position.
5. Change from diesel to electric engines.
6. Blow the air from the ballast tanks.

If you forget one of the more critical operations then the most realistic waves glug up the screen and as you breath your last, a message says 'You forgot to close the air intake vents . . . you are dead!'

Even if you manage to cope with that routine, there are more perils. If you fail to trim the boat, you will go too deep and be crushed by the pressure. Should you stay under too long you may use up all your air or electrical power.

After waiting a couple of minutes at a depth of 50 metres plus, you hear the sound of depth charges. If you weren't deep enough you get hit. Then you have to prepare to surface.

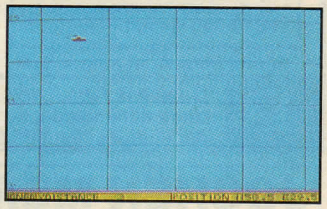
1. Clear ballast tanks.
2. Set hydroplanes to surface.
3. On reaching the surface, open air intakes.
4. Change to main diesel engines.

All these manoeuvres are accomplished by means of key presses. Thankfully all of them are set out on the back of the very descriptive manual for easy and quick reference.

Fine then, you have successfully avoided the aircraft and you are homing in on the target. However as you approach, you notice that the soundings change direction. . . the enemy is weaving from side to side in order to avoid you!

You manage to come within firing distance. . . he is in your sights. . . you fire your torpedo . . . did you remember to open the torpedo flaps?. . . Oh dear . . . glug glug glug!

As you can tell from the narrative the action is pretty hairy, and it is made more so by the very realistic sounds of the

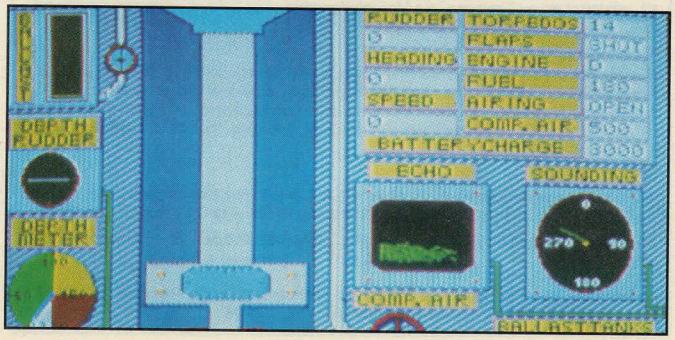


engines and sonar blips. You have many instruments to monitor and much to think about; all factors which go into making a very enjoyable game.

There are five levels of difficulty including one for training.

Taken as a whole the simulation is a very realistic one with enough going on to stop you getting bored for many months. I found the amount of weaving by the target ships a little disconcerting, but as the manual points out, you won't achieve success unless you practice. The graphics are first class and the program represents very good value for money.

Now where was I?. . . Down periscope – Blow ballast tanks – close vents. . .



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RIGHTING ROMS

The glut of Minerva versions has triggered further confusion about QL rom differences. Simon Goodwin summarises.

There are at least 50 different QL-compatible operating systems in use these days: each version has its own bugs and features. This short series explores the changes in the latest roms, testing Thor XVI and *Minerva* updates, and uncovering more fiendish faults in old Sinclair roms.

Background

QDOS is the QL Operating System – the program that's there when you turn on the computer. Argos is the Thor equivalent. Both have a built-in programming language, SuperBasic.

QDOS and SuperBasic are supplied in preset read only memory chips (roms) or electrically programmable eproms. Internal codes identify each version. The 'SuperBasic version' is identified by initials revealed by the SuperBasic command PRINT VER$. The 'OS version' is found with the machine-code system-call MT.INF; it's usually a decimal value packed into four Ascii bytes.

QDOS was near 0.08 within Sinclair when MD Nigel Searle decided to launch the unfinished machine, boosting Sinclair's stock price and scooping Apple's long-previewed Macintosh. Three months later, the first QDOS systems were 1.00 and 1.01, corresponding to VER$ FB and PM. They were packed with bugs and needed a 'kludge board' to carry extra chips outside the computer.

Soon they were replaced by AH and JM, inside the box, with fewer bugs. These were QDOS 1.02 and 1.03, and some people still use them happily today. AH and JM roms have their faults but the core works well, and most users have had five or six years to get used to the bugs. I designed and wrote *Supercharge* on an AH QL without serious rom problems.

The next Sinclair release was the differently-bugged JS (1.10), followed by JSU, for the US market. Then came MG (1.13), a major improvement, supplied in chips marked Copyright 1985, rather than 1983.

MG roms come in national variants; a third letter indicates the nationality of the messages, keys and character-set in the smaller (16K) rom. MGF roms expect a French Azerty keyboard, MGI suits Italians, and so on. The extra letter replaces the decimal point in the QDOS number, giving 1F13 or whatever.

Sinclair released relatively few roms compared with the prolific output of QView and Thor International. These use re-programmable eproms, so they have tended to release code as soon as it seemed to work. They're more cautious these days, and with good reason.

System rom changes are a potential minefield. QDOS was hurriedly written, and has since been hacked by a succession of Sinclair programmers. Many routines that could have been done better remain buried in official roms; enthusiasts with the time and the know-how are tempted to re-code them and release the result. That's fine, as long as the modified system does not fail where it used to do something useful.

QView's Minerva code is a 'fixed' system which improves upon Sinclair's JS, MG and the un-released 64K QDOS, code-named *Tyche* (fate, appropriately enough) shortly before the 1986 sell-out.

All Minerva eproms show VER$ as JSL1, but the current family have OS numbers in percentile steps from 1.61 to 1.82. PRINT VER$ (-2) shows Minerva's OS version. There have been 19 releases of Minerva since my original article a year ago.

Obsolete Thor 1 and Thor 20 systems purport to use QDOS 4.xx and 5.xx, but they're really based on Sinclair's JS. The 16 bit Thor XVI has gone through ten rom revisions since its launch in 1988. Argos has stabilised at 6.41, which has given me a chance to identify and isolate some of its peculiarities.

Minerva 1.82

From the start, Minerva has offered many advantages over early Sinclair roms; there is no room here to list these again. See my article in November 1989, or Mike Lloyd's update in September 1990.

The price of the eprom has risen by £10 since the launch, but QView now supply printed documentation for Minerva, in the form of a 50 page typeset manual spiral bound with card cover. Early versions had much of the same text on disk, but the information in the *Technical Guide* is easier to find and more complete.

Since my last report QView have documented vectors for data conversion, NEW, INSTR, arithmetic, parameter handling, serial port and microdrive control. The keyboard routines are now vectored, and there's a fast memory-mover, accessible with CALL. Even RANDOMISE takes an optional parameter, to make random numbers extra-hard to predict.

The accompanying disk includes several 1.5K files which replace messages, key assignments and with Sinclair national variations. Versions mimic MGF, MGG, MGD and MGY (Finland); there's also a driver for ABC's PC-style keyboard, with source code; QView offer to put these in eprom at nominal charge to anyone with a spare socket.

Reports now show the statement number as well as the line where errors occur. The manual says that the cursor is automatically positioned at the error location when a 'bad line' is re-presented, but I'm glad to say that feature has been removed from 1.82, as it stops ALT-ENTER from working as expected.

Minerva has gone through 22 incarnations at the time of writing. I bought the original 1.61, upgraded to 1.63, and received 1.82 for review. I shall return my 1.63, with some trepidation. We have received anguished reports of Minerva bugs from readers and users. Some of these are genuine problems, but many people seem just confused. It is almost impossible to investigate bugs unless you tell me your rom version and provide a short example to illustrate the problem.

QL World has received a postcard from Hans-Peter Recktenwald of Berlin, who says: "There are some really annoying bugs in Minerva", but the 'serious' bug he cites is not a bug at all. He complains that the file pointer variable P is updated by *Toolkit 2*'s PUT command, so PUT #f\P,x% changes the value of P.

That is exactly what PUT is meant to do, according to Section 12.2 of the Toolkit manual. Minerva makes no difference. The variable is unchanged if you put it in an expression, like: PUT #f\(P),x%.

Basic tutor Mike Lloyd tells me he has reverted to the JS rom after serial port problems were exacerbated by Minerva 1.82. He found that occasional characters were corrupted en route to his printer, even under JS, but the problem became much worse when he switched to Minerva. It is possible that the problem is a hardware/software interaction, as Mike has not tried the same set-up with a different computer.

In their documentation of Serial Drivers, QView admit "the current version still suffers from some problems", but they have made progress. Sinclair's serial driver used to put the wrong parity on the Control Z at the end of a file, and ignore it on input, but QView have fixed that.

QL task priorities range from 0 to 127. System designers Tony Tebby and David Oliver have told me that the higher priorities up to 255 should work, and some people use them deliberately: for instance Digital Precision recommended the use of priority 255 as a way of squeezing extra performance from *Solution.*

The common Toolkit extension SPJOB passes a parameter byte to the system without any checking. The parameter is read as an integer from -32768 to 32767, but only the least significant byte is trans-

ferred, reducing the value MOD 256. SPJOB 0,0,179 gives Basic priority 179, SPJOB 0,0,258 sets priority 2 and SPJOB 0,0,-6 sets it to 250. This whacky rule works consistently on Argos and all Sinclair roms, but Minerva has other ideas.

Bytes can be signed or unsigned. LIST_TASKS shows signed values -128 to 127, while the similar JOBS command shows them as unsigned 0-255. Argos and Sinclair roms treat the undocumented priorities as a range upwards from 127, so a task at priority 255 runs faster than one at 127. QView think differently; they express the same range as -128 to -1 and assign it to background tasks. These only run in the absence of active tasks with 'positive' priorities, 1-127.

This change was not as helpful as it first may have seemed, as some users already use those priorities in a consistent way, but I can see the appeal of background tasks to anyone who does not find their most urgent tasks unexpectedly giving way to all others. Maybe QView will make this configurable, and default to compatibility.

The QL has its own way of sorting values. Sadly the rule used to put things in order has changed several times, and it is still not always right. Ordered lists can change sequence if you run your programs on a different rom. The correct sequence has never before been published; the 'string comparison' section in the Concepts part of the *QL User Guide* is wrong, and Jan Jones' book skates over this topic in just seven lines.

I have spent long hours investigating this problem, and find that AH roms are subtly different from JM and JS, which are markedly different from MG and Minerva. Before I catalogue the differences I should explain further.

Most micros use the American Ascii sequence for ordering characters. This is fast, but not the same sequence as a librarian would use. Often Ascii lists end up in unexpected order after sorting. Ascii puts all the capital letters before lower case, so "IBM" comes before "Iain". Digits are compared one by one, from the left, so PCs think "$270" is less than "$28".

QLs get the right answer in both cases, on all roms, because they follow a complicated rule to recognise imbedded numbers and treat small and CAPITAL letters equally. But bugs in roms up to JS mean that comparisons and INSTR searches may go wild if character codes are greater than 127. This affects accents, special characters, and comparisons meant to screen out control key-codes in the range 192-255.

QDOS users are understandably confused about the sorting order of the full stop, which often crops up in abbreviations, initials, and decimals. The AH rom treats "." as if it were a minimalist form of "0.0". JM and JS roms are similar, but consider that "." is slightly *less* than zero. Argos, Minerva and MG roms put "." *after* the digits, letters, accents and control codes.

The MG collating sequence starts with digits from 0 to 9, followed by letters of the alphabet: A, a, B, b and so on up to z. Then comes the underscore, followed by twelve accented pairs (capitals first), 16 accented vowels, Beta, and all remaining codes, including ".", in Ascii order from CHR$(0) to CHR$(255).

UK roms cope fairly well with standard codes from 32 to 127, but higher codes are treated increasingly oddly. JS quicksorts accented codes 128-191 first, followed by ".", digits 0 to 9 and letters from Aa to Zz, underscore, CHR$(0) to CHR$(45), /, then remaining Ascii punctuation from colon, CHR$(58), to © (copyright), CHR$(127).

Codes 192 to 255 are scattered among this lot in a bizarre way. CHR$(192) to CHR$(205) come as expected after CHR$(191), but CHR$(206) matches ".", followed by 207, then digits with codes 208 to 217 interspersed. Next come 218-224, then letters, with 225 to 250 interspersed. The remaining codes 251 to 255 fit in just before underscore, followed by the rest in Ascii order.

The Thor XVI follows the same rule as MG and Minerva, but it goes wrong on character-sets that have more than the usual number of small and capital equivalents. Argos can swap founts with alacrity, but it carries on ordering Greek and Russian alphabets as if they were standard QL characters, and fails to equivalence many characters in the extended second font.

It is good that the QL knows that "$4" is less than "$20", but the scheme can't cope with negative numbers in text. QDOS thinks "Balance -20" is less than "Balance -22". If you need to sequence signed values correctly you must extract the value from the string and compare numbers, not text.

JS and earlier roms go wrong if you write: IF KEY$ > CHR$(191), trying to select control key codes from 192 to 255. That tests succeeds for all codes below 12B as well as codes over 191. QDOS works as well as expected if you use an Ascii numeric comparison: IF CODE(keys$)>191.

QView ask for ideas that "add to the extendability of the system". I'd like to see a vectored comparison table: a pointer to 256 bytes giving the sequence number for codes 0-255. Thus anyone could re-order the set, bringing accents and un-accented characters together, or making codes equivalent by using the same sequence number for both. This would make QDOS more configurable, and could hardly make comparisons more confusing.

Minerva 1.82 has an improved ram test which displays the address of faulty ram in big letters on-screen if a problem is found. This test is faster yet more thorough than Sinclair's, so it may show faults that earlier roms let through. I think this is a good thing, but no ram test can be exhaustive. Faults may depend on the exact pattern of values in memory, and a mere 128 bytes can hold 1.797693E+308 distinct patterns – that's a 309 digit number!

Version 1.82 reduces the delay before the system auto-starts to ten seconds, while early Minervae waited half a minute for a function key before starting anyway. I think the delay should be either nothing or infinite, depending on whether a BOOT file is found.

It is annoying to have to race to get a disk in the drive before Minerva starts without me, but I'd like the machine to re-start as soon as it's ready, if it can find a BOOT file. Ideally Minerva should check the drive twice – once during start-up and, if necessary later, when the user is ready.

If it finds a BOOT file during the rom start-up sequence it should load it without waiting for F1 or F2, like the Thor. Otherwise it should wait for a key, then consult the drive again to see if a BOOT file has appeared. At the moment we have to type LRUN FLP1_BOOT to get things going again if our disk misses the ten-second curfew.

Minerva programmer Laurence Reeves says he has fixed an obscure but nasty bug in the ATAN function on Argos and Sinclair roms. If the SuperBasic task is more than 32K long four bytes are stored in memory almost at random, every time ATAN is called.

The problem is similar to the CALL fault on early roms; ATAN includes some word addressing that misses its target if a large program is loaded. ATAN gets the right answer, but randomly corrupts your memory in the process. Minerva is the only known cure for this bug, buried deep in the QDOS maths package.

Benign Bugs

I'm pleased to see readers using undocumented CLS, PAN and SCROLL parameters uncovered in past rom reviews, controlling cursors or file pointers without need of any Toolkit. These work on all Sinclair roms, Minerva 1.61 and 1.82, but QView 'corrected' the procedure code on Minerva 1.63, so that the undocumented parameters were rejected. These 'benign bugs' are restored in later eproms, after howls of protest. Thor International have also rewritten the commands, so the tricks worked on early versions of Argos, but are rejected by Argos 6.41.

A mistake in Minerva 1.63 meant that ADATE has the same effect as SDATE; any attempt to advance the clock by one hour took you back to 1am on 1st January 1961. The cure is to add the current DATE to the ADATE parameter, or upgrade to a later eprom.

Some programs are hesitant on Minerva, Thor XVI and MG roms because they use repeated calls to ADATE 1 to wind the

clock forward by a second under keyboard control. This is quite common in 'clock setting' utilities, though I prefer to type the digits.

Early Sinclair roms just bumped on the time by the required amount, regardless of when the clock was next due to 'tick', but MG and its followers wait up to a second for the next tick before advancing the time. This shows the difference:

```
10 REPeat 1 : ADATE 1 : PRINT DATE$
```

Later roms print just one line per second, with successive dates two seconds apart. Early roms produce a rapid stream of dates one second apart. Which is 'best' depends on your existing software, but it is good to be aware of the inconsistency.

A loop/parameter bug mysteriously stops some programs working on Thors and later Sinclair roms, even if they were fine on vintage AH and JM systems. This problem is well worth noting if you develop structured programs that may have to run on JS or MG roms. For once, spaghetti programmers can relax. You will never see the bug unless you use SuperBasic procedures or functions with two or more parameters.

It transpires that while any name has been used as the first of several parameters in a DEF PROC or DEF FN, it may not be used as a FOR loop name. If you try, JS and MG roms report a 'bad name' error.

This would not be too bad if LOCAL declarations made a difference, but they don't. **Listing 1** shows the problem as it usually appears. The bug just affects the first parameter name, and then only if there is more than one.

I found this bug while exploring the Quanta library. *ChessSet_Bas* on the MISC/DEMO disk stops with a spurious 'bad name' on all Thor XVI roms, QL MG and JS systems, but works perfectly on the AH and JM roms available when it was written.

The program is elegantly structured as lots of small, independent procedures. In deference to a common convention in mathematics (and Fortran) the author uses the identifiers I and J for temporary counts, often declared as LOCAL. The problem stems from DEF PROC DRAWTO(I,J), and vanishes if you rename I to XX between lines 900 and 1180. I can imagine X or A causing similar problems in other programs.

This could be seen as a punishment for un-imaginative variable naming, but that's unfair. We should be able to use anything we like as a LOCAL identifier. If we can't, it's a bug. Ten years ago I worked with a programmer who used arbitrary animal names in rough alphabetical order to label all the routines in a big minicomputer assembler program. Imagination can take over!

I should define this problem in precise jargon. On MG and JS roms, the first identifier of more than one in an argument list may not be used as a FOR identifier, in that definition or any procedure or function it calls, even if that identifier is later declared LOCAL. This describes the problem precisely to those who understand the terms or can look them up in Jan Jones' *Definitive SuperBasic* book.

Listing 1

```
QL World December 1990 - ROMS RIGHTED

100 REMark "MG"/"JS" parameter bug
110 REMark QL World  December 1990
120 :
130 TEST i,j
140 :
150 DEFine PROCedure TEST(i,j)
160 LOOP
170 END DEFine
180 :
190 DEFine PROCedure LOOP
200 LOCal i
210 FOR i=1 TO 2:REMark Bad?
220 END DEFine
```

Listing 2

```
100 REMark OUT & FOR parameter bug
110 REMark QL World  December 1990
120 :
130 LET count=10 : limit=0
140 DIM values(count)
150 TEST total
160 PRINT"Totalled at ";total
170 :
180 DEFine PROCedure TEST(sum)
190 REMark Scan COUNT values for TOTAL
200 REMark Some imagination required...
210 FOR sum=1 TO count
220   IF value(sum)=limit : EXIT sum
230 END FOR sum
240 END DEFine TEST
```

Minerva 1.82 does not have that bug, but it does show another peculiarity in parameter handling that may cause confusion on any QDOS or Argos to date. In theory, parameter values can be passed in, out or both ways when a procedure or function is called. In practice you can't pass a parameter OUT if it is used internally as a FOR identifier, unless it had a value before the call.

In other words, SuperBasic supports IN and IN/OUT parameters, but not OUT parameters that start life as FOR identifiers. **Listing 2** shows how this can cause problems. The cure is to add a line LET total=0 (or any other value) at the start.

This is not a serious problem, and should not be confused with the other FOR parameter bug; it can be a bit disconcerting to find that a FOR loop prompts a 'bad name' report. Fix it by assigning a dummy value to the parameter.

QView have made one major change to the SuperBasic interpreter, with repercussions for many programming tools; thankfully they give a POKE to restore the old state of affairs; I wish they had set the opposite default. Like everything else in a SuperBasic program, numbers are 'tokenised'. That means they are stored in a standard internal form. Regardless of the number of digits, every number in a loaded program is held as a six byte floating-point value.

That's convenient, as the interpreter uses floating point numbers almost exclusively, and spends so much time in floating-point conversions that X%=X%+1 takes longer than X=X+1. Compilers prove that the QL can perform integer arithmetic much faster than floating-point, but the reverse is true for Sinclair's interpreter.

Lawrence took pains to ensure that Minerva used integer arithmetic where possible, and it irked him to think that X%=X%+1 should involve reading the six byte floating-point value '1' and telescoping it into a simple integer before the fast adder came into play. What's more, it slowed things down again.

Minerva 1.76 changed the rules, introducing integer tokens that Sinclair planned but never used. These save a little memory, taking four bytes for standard integers +/- 32K, and two for numbers in the range -128 to 127.

QView say that "programs using integer tokens run about 10% faster and take about 15% less space." Of course, that

depends on the program. Big lists of byte DATA may shrink even more, though they will probably still be larger than corresponding Ascii SAVE files.

Integer tokens can slow some programs down: if you write X=X+1 the integer 1 must be converted to floating-point before it can be added to X. This may happen a lot unless you are happy to type per cent signs after integer names. *Turbo* and *Q-Liberator* have their own IMPLICIT directives so any name can be treated as an integer; many programmers prefer that approach.

Turbo keeps track of the context of an expression, and uses the appropriate number formats to suit the program and minimise conversion. For instance X=X+1 uses floating-point 1, albeit in a fast packed 4-byte form. X%=X%+1 generates an integer 1, for speed and conciseness; X=(X%+1)+X+1 uses an integer inside the brackets, and a float outside.

Integer tokens cause problems for current Basic compilers. They also upset *DIY Toolkit's* REPLACE (Volume R/June 1988) and other program-scanners, like *Supercharge, XREF* and *SuperBasic-C-Port.*

QView warn that a technique shown in the Toolkit 2 manual is invalidated by integer tokenisation. Sinclair roms convert integers to floating point form if you add zero to them in BPUT. Try that on Minerva and you wind up four bytes short; the value remains an integer unless you add a floating-point variable or bias like le-555.

QView have themselves fallen foul of the new tokens. The built-in RENUM command ignores references to lines with numbers from 1 to 127; other numbers are correctly updated, but small integers stay the same. This could cause a lot of confusion. The cure is simple, and suits the BOOT file:

```
POKE \\212,128
```

This restores the Sinclair scheme, with all values in bloating point form, and compilers, scanners and REPLACE working perfectly. Phew!

Minerva 1.82 has improved PEEK and POKE routines, which use punctuation characters to specify address offsets inside SuperBasic or among the System Variables. Whole lists of values of the same size can be POKEd in one go. Turbo can't compile these variants. It does not call the rom to POKE or PEEK when it could use a single machine instruction to do the same, and avoid the great overhead of passing parameters to rom.

Turbo and Supercharge deliberately check the parameters of 'standard' procedures and functions against the documented syntax, and report typing mistakes like WINDOW 512,256,0 or SCALE 100,0,0,0. I think good compilers report every error they can find at compile time, rather than leave easy checks until execution. It's easier to do otherwise, but he compilers would make slower and less reliable tasks as a result.

Unfortunately this checking means that the new flexible parameters of the latest Thor and Minerva roms are not accepted. I have sent relevant details to Chas Dillon, who has the Turbo parser source; I understand that he has finished *Turbo 3,* with such features and hopes that DP will pay for it. The same goes for PDQL and SuperBASIC-C-Port.

Early Minervae clash with common programs which POKE system bytes that Sinclair left free, but QView used. By the time Minerva arrived Eidersoft, DP, Sector and QJump had found and claimed these bytes for various purposes, so they were already causing contention.

The latest Minerva roms cure this with a new system area in space formerly occupied by QDOS channel table entries. Now you can only open 304 channels at once, on an expanded machine; Sinclair allowed 360. 128K users get 'just' 112, which should be enough. Laurence puts the extra 224 bytes to good use, with device linkages and other ram vectors, plus bytes to configure the cursor, fonts, messages, tokens, keys and VER$!

An apparent bug in Minerva's BLOCK routine causes spurious crashes on Lear Data Systems' new *PCB Designer* and the *Flightdeck* simulator. Both work fine on Sinclair roms, but fall foul of the latest Minerva 1.82; tasks abort, reporting an unexpected 'out of range' error. I have tracked this down to calls to SD.FILL (TRAP #3) and presume that Laurence has 'corrected' an internal check so that programs that used to work now report an error.

Unfortunately that's enough to clobber all the programs that used such parameters with impunity, and you can't go into a shop and ask suppliers if a programmer or compiler has used SD.FILL near its limits – you just have to trust to luck. I'm sure these are not the only cases that fail on Minerva 1.82, but several other programs that use BLOCK work fine.

The first versions of Minerva could get the 'owner' wrong when creating tasks, preventing tasks from chaining correctly. This bug seems to be fixed in 1.82.

I understand that earlier Minerva roms had a problem in the BORDER statement; Sinclair roms let all its parameters default, so BORDER alone resets the width of #1 to zero. Some Minervae need BORDER 0.

This must be an easy bug to introduce, because Argos 6.41 has just the same problem. The cure is to add an explicit width of zero, in interpreted Basic – or swap to your old roms if the error is in a task that you must use and cannot re-compile.

Thor International are proud to tell me that Argos 6.41 computes COS (P1/2) to be exactly zero, rather than very nearly zero. Minerva returns 6.076917E-11, which is good enough for me, and NASA . . .

Eidersoft's long-gone ICE front end is incompatible with both new roms – it has never run on the Thor XVI, and the pointer is frozen on Minerva 1.82 after the pretty icons appear. I don't think this is a great loss, although a few people still use ICE to manage disks and copy files.

I understand that V1 of the Belgian art program *Painter* suits all QLs and Minerva roms, but the latest twelve screen version crashes as soon as you try to use the third screen. I have not been able to investigate this.

Minerva 1.67 interacts badly with QJump's Toolkit 2. Normally the microdrives are controlled by a 'linkage block' in rom, but Toolkit 2 replaces that with a ram linkage that allows microdrive files to be renamed, truncated, overwritten or flushed, as well as the standard operations. Unfortunately 1.67 goes wrong because the Toolkit sees that Minerva's linkage block is already in ram, and thinks it has linked the new code already.

Later versions of Minerva include the new code, so it doesn't matter what Toolkit 2 does. It's possible to tell who has won by checking the date with WSTAT, after renaming a file. Toolkit 2 changes the update date, Minerva does not.

Minerva has character shapes for every possible character code from 0 to 255, but QView warn "don't rely on them" – they may be supplanted by new code. Some versions work by a trick that disturbs Speedscreen and several font editors. They store patterns for character codes 0 to 30 in the second font, immediately after the new patterns for codes 191 to 255.

Speedscreen presumes that a font is a single contiguous group of characters, and works faster accordingly, but this means character codes 0 to 30 appear as splodges unless Speedscreen is turned off. It makes no difference to Psion programs, *Qmon,* or other utilities which suppress control codes or show them in their own way, like *The Editor.*

Speedscreen can handle all 256 characters, at top speed, if you merge the entire character set into a new font and use that. QView has helped in this regard by putting the system font addresses in an easily-POKEd place, so you can assign an alternative font to all new windows. Version "p" suits Minerva's twin-screen mode.

QView let RESPR work while tasks are running, allocating space at the other end of the system memory. This is usually convenient, but can cause problems, as RESPR has two uses. RESPR(0) returns the address of the start of Sinclair's RESPR area, which moves down as the area expands, while RESPR(n) reserves n bytes (rounding up to the next 512 bytes) from the RESPR area – or the heap, on Minerva.

Some programs in the Quanta library eliminate a variable by loading code like this: LBYTES "FLP1_CODE",RESPR(512) : CALL RESPRO(0). Don't try this on Minerva with tasks running; the code will end up on the heap, but RESPR(0) will not find it. Use x=RESPR(512) : LBYTES "FLP1_CODE",x : CALL x, or LINKUP from DIY Toolkit Volume H.

Minerva allows long strings of prefix operators like —3, or -~~3 (aka 4). Sinclair and Thor roms prohibit two prefix operators in succession, although they do allow —3, and -(~~3), so this 'improvement' is minor.

Minerva 1.82 fails to link the functions in *Turbo Toolkit* when they are loaded. The manual says this is because the functions PROCEDURE and FUNCTION are illegal as they clash with rom keywords – but they work perfectly on earlier Minervae, all Sinclair roms, Thors and emulators. Turbo uses them in directives like GLOBAL FUNCTION and EXTERNAL PROCEDURE which declare routines shared between concurrent tasks.

Turbo Toolkit users who want to accommodate Minerva must change the names in every copy of the toolkit file. I replaced the Cs with Ks, for PROKEDURE and FUNKTION, but I wince every time I see it. I designed Turbo Toolkit, so I'm biased, but I find this change in Minerva rather silly.

If Sinclair had applied QView's 'law' the AH rom would have been unusable. It uses "INPUT" and "EOF" as keyword tokens 15 and 16, and also defines the same names in the Name Table, as a procedure and a function. Yet the resident extensions INPUT and EOF work as well on AH as on any other Sinclair rom, although they also appear as fixed keywords, listed on page 118 of Andrew Pennell's *QDOS Companion.*

SuperBasic was planned to have WHEN INPUT and WHEN EOF keyword clauses (like early Tandy laptops), but these were abandoned as Sinclair struggled with WHEN ERRor and WHEN Variable. Jan Jones' tokenisation routines can tell the difference by spotting the prior WHEN keyword, just as they tell GLOBAL PROCEDURE from DEFine PROCedure by context, and tokenise commas differently depending whether they delimit subscripts or parameters. QView should restore Sinclair's code.

Minerva also prohibits 'illegal' characters in procedure and function names which Sinclair accepted. For a while this stopped Oliver Neef's epic *Return to Eden* running on Minerva, as it used resident names containing hairpins and dashes "<->"; CGH Services can supply an alternative version for Minerva 1.81.

Six years' experience confirms that many corrections cure one program only to undermine another. You're no better off with the latest rom if it stops you using your old software. QView has a sensible policy of providing one free upgrade to users beset by bugs, but it's hard to know which version is 'best'. My favourites are QDOS 1.13, Minerva 1.64 or 1.82, Argos 6.39 or 6.41. By the time you read this, there may be new champions, but those five are pretty good.

As I explained last year, you need to take the computer apart to fit new roms or eproms. This is a fiddle, but it means you can put the old chips back if new problems develop. Users with early UK roms AH, JM and JS will probably find their machine more reliable if they switch to Minerva, but they should bear in mind that not all the subtle changes may be improvements.

MG and JSU users must base their judgement on a personal assessment of Minerva's 'extras'. Some Sinclair variants are arguably better-tailored to users outside the UK. The price has risen but the extra interpreters, documentation and command improvements make Minerva very desirable to avid QL hackers.

Minerva 1.82 costs £40, including one free upgrade on request. Quanta members get £5 discount; overseas delivery £2.50 extra.

In January's QL World I shall reveal further details of Argos 6.41, and more DIY Toolkit code!

Recent Minervae can run extra interpreters, keeping SuperBasic tokens in other tasks besides the initial task (0,0). This feature was announced in the July 1990 issue of Quanta, duplicating the name of my MultiBasic feature in the March 1990 QL World, which was, incidentally, held up by the sale of Focus Magazines.

The confusion of names is misleading, as there are many differences between QL World MultiBasic and QView's extra interpreters; both take about the same amount of memory for extra tasks, but they have unique advantages and disadvantages. Luckily you can get the best of both worlds by using both at once.

DIYT MultiBasic tasks are statically allocated, like compiled tasks. They are created with SuperBasic commands UNLOAD, RESAVE and RELOAD. New MultiBasic's inherit the program, extensions, variables and screen of task 0.

DIY Toolkit MultiBasic means compiler users can avoid repeated slow re-loading, even if they want to use several programs in the course of a session. It also helps in software development, because you can save old versions and revert to them instantly if experimental changes make things worse. MultiBasic tasks can have long, user-chosen names so it is easy to indicate their development hierarchy.

MultiBasic works on all QDOS and Thor roms, without interpreter changes, so it can only interpret one token file at a time, but it lets them share control of the machine, offering 'co-operative multi-tasking' like Apple's *Multi-Finder.* Minerva rom tweaks mean it can swap between several token files pre-emptively. Multiple interpreters run as quite separate tasks, and tokens and values cannot be passed between them except through channels, POKE or PEEK.

Extra interpreters are dynamic, so they move around memory as programs load or run, expanding and contracting internal memory areas and other interpreters as well. To avoid constantly disturbing one another, they seem to grab spare memory in big steps when they need to expand. I wrote a minimal two-line recursive program to test ram allocation, and monitored it from another task. After a few seconds free ram fell from 382,464 to 263,168 bytes. The extra interpreter grabbed 119,296 bytes in one swoop, but I got it all back when I killed the task.

Extra interpreters can share or inherit resident procedures and functions, but each one starts empty, apart from a single string variable passed as a parameter to the task. Extra interpreters are created by running a small task:

```
EX RAM1_MULTIB_EXE;"flp1_boot>param"
```

This command creates an empty SuperBasic task, with the name "SB.<jobnum>", copies 'param' to the variable CMD$, and starts loading from "FLP1_BOOT". The task starts with only one window, accessible with #0 or #1, but you can pass channels as parameters, or open more as long as you're careful to do it in the prescribed order. CLOSE #0 kills the task.

CTRL-ALT-SPACE breaks into all SuperBasic interpreters except the normal one, task 0, which remains under the control of CTRL-SPACE. This makes it hard to leave a program running continuously in extra interpreter while you adjust another, as they all stop whenever you need to break into any one.

The point is that Minerva gets rather unwieldy when you use more than one extra interpreter; when you break into one they all report not complete at once, and you must CONTINUE any that should not have stopped. Earlier Minerva versions used CTRL-ALT-SPACE as a standard way to switch between tasks. This was a good idea as CTRL-C is redefinable and does not always work. Unfortunately this idea was dropped to make way for extra interpreters.

You can do most of the things in an extra interpreter that you can do in task 0, with a few exceptions. Protected programs like *Fleet Tactical Command* and Psion's *QDraw* only load into task 0. Extra interpreters simply vanish after loading the boot program.

Current Basic compilers only read tokens from task 0, so you can't use CHARGE or LIBERATE from an extra interpreter. *Q-Lib*3.3 is compatible with earlier Minervae but reports 'not implemented yet' if you try to QLOAD a file QSAVEd from an extra interpreter. QView provide a patched version of QLOAD that suits Minerva's second screen mode, but even that will not fast-load Basic into extra interpreters, which make LOAD even slower than usual.

SET_PRIORITY gives 'not implemented yet' if used from an extra interpreter, but SPJOB is OK. Turbo Toolkit BASIC_PEEKs seem happy, but always access task 0; DIY Toolkit's BPOKE and BPEEK give expression errors or 'overflow' in extra interpreters, but work as usual in Minerva's Task 0.

Multiple interpreters are great fun for hackers and code explorers; QDOS is much more resilient if you can Control C out of a smashed interpreter and into a new one, ready to load another if need be. There's a lot of scope for linked programs, and filter testing is made relatively easy, but production systems will continue to be built with SuperBasic compilers, to avoid the compatibility, speed and size limitations of multiple interpretation.

QView's achievement is impressive, but there is much work to be done. There should be a way to break into one particular interpreter, without upsetting all the other extra ones. Assembler programmers should have little trouble changing MULTIB_EXE to use meaningful task names. It would be nice to be able to move tokenised lines between interpreters or inherit programs that are already LOADed, to avoid slow re-tokenising. Of course, you can still do that with MultiBasic, but RELOAD only works into the initial SuperBasic task, even on Minerva.

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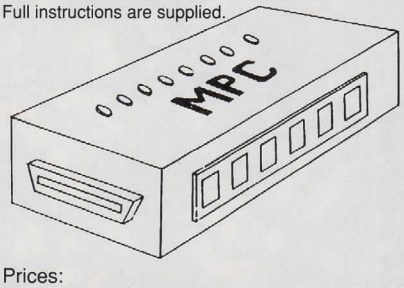

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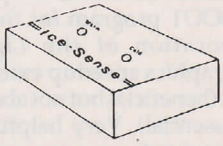

This electronic 'Black Box' product is easily fitted to most vehicles with a 12 Volt supply and gives warning of impending ICY ROAD conditions.

Availability

DI-REN products are available from:

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SE23-3EP
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QLympic Computer Systems
Quellenweg 18
4220 Dinslaken
W.GERMANY
02134/91766

Ordering From DI-REN

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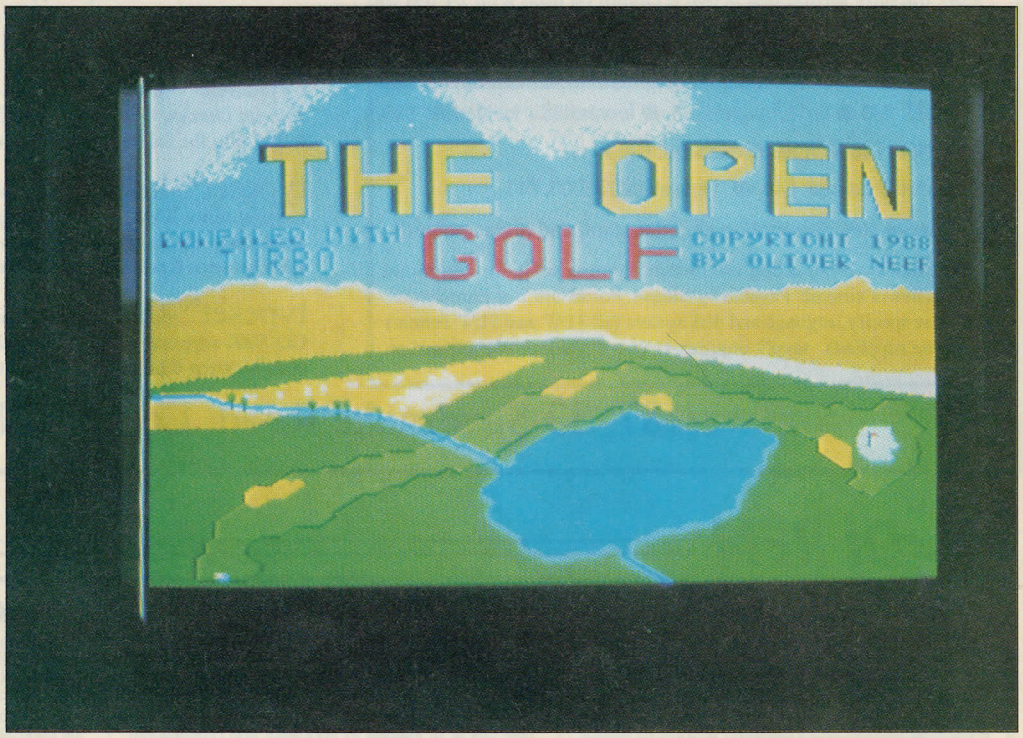
Access/Visa telephone orders accepted.
Cheques should be made payable to DI-REN.
Clearly state your name, address and product required.
Further product details available on request.

SOFTWARE FILE

INFORMATION
Program: Open Golf V5.12 A golf playing simulation for the QL by Oliver Neef.
Publisher: CGH Services, Cwm Gwen Hall, Pencader, Dyfed, Wales SA39 9HA.
640K memory with 85 column colour monitor. Minerva compatible.
Price: £9.00, disk only.

John Shaw takes delivery of a golf club with fifty courses, a couce of slice or hook, and no caddie required – except your QL



I must confess that it came as a bit of a shock to me that the day my wife and I had made an application for golf lessons, a parcel should arrive with Oliver Neef's simulation in it for me to test. What you might call, an interesting case of QL_ESP!

So, it was with some great interest that I started to try out the program. Would it be a cheap sham requiring little skill or would it help us, and at the same time provide a reasonable degree of amusement and pleasure? We shall see!

The disk came with a informative manual which initially instructed me on the way in which it could be adapted according to the player's computer set-up. It gave, for example, advice on modifying the BOOT for a Microperipherals disk controller and also a specimen BOOT program for the incorporation of the *Lightning* graphics speedup extensions . . . (beneficial but not absolutely essential). Very helpful, CGH Services!

So far, so good; but would I be confused by golf jargon? Not a bit of it. The manual carefully goes through virtually every aspect of the game including choice of club, so that even a non-golfer can enjoy the program.

The simulation itself has an incredible selection of fifty different courses, each having eighteen holes . . . not much chance of getting bored here.

The initial screen offers you the choice of a demonstration

or a game. The demonstration goes through all the commands and different views and should be used by all newcomers to the program.

You are then offered the alternative of any of the fifty courses. There is an equivalent 'high score table' for each, which can be loaded before each game.

The playing screen shows three windows, as follows:

1. A large left hand window occupying approximately 70% of the screen, gives birds eye view of the course showing the 'tee' (where you start hitting from) at the bottom. The flag marking the hole is dark blue and the course features are set out in appropriate colours. Lakes and brooks are in light blue, bunkers (sand pits) are in yellow. Trees, rough grass and the fairway are in different shades of green. All very authentic.

2. The top right window gives you a perspective view of your location including an animated figure playing the golf shot!

3. The right middle window displays the essential game parameters: the club (together with its effective range, the wind and a sliding scale for you to choose 'strength of shot' and the amount of 'curve' you wish to put on the ball. (It actually curves in the visual display as well . . . very impressive.)

The right bottom window gives messages – some not very complimentary!

The position of the ball is shown on the screen by a red cross and by pressing 'R' a graduated scale or 'ruler' is presented at the edge of the screen to enable you to assess the strength of shot required and the best type of club for the purpose.

The club is selected by operating the cursor keys which scroll through the different types: driver, woods, irons, wedge and sandwedge. As each name is displayed, the mean distance achievable by that club is also shown.

In order to make your shot therefore, you have to:

a. Decide on the general direction of the shot, by means of the left and right cursor keys.
b. Select the most appropriate club (tips are given on this in the manual).
c. Choose the strength of effort required for the shot.
d. Assess the amount of curve (slice or hook) you wish to put on the ball.

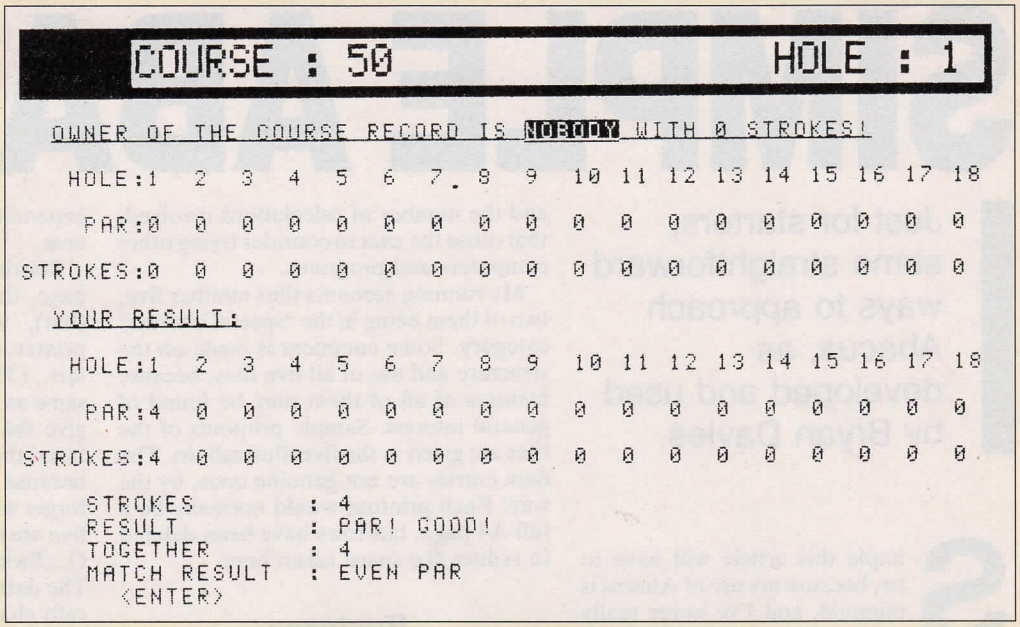
The hazards which stop you getting your hole-in-one are wind (which varies in strength and direction), bunkers, trees, lakes, streams, and areas of rough grass.

As you progress down the fairway, the scene window changes in a manner resembling the view you would expect to see if you were there! Very clever stuff.

At the end of the eighteen holes your score is displayed hole by hole, with birdies and eagles etc. highlighted.

Did I enjoy it? A most assured 'yes'. I found the variation of challenge and the superb graphics made this a most addictive simulation and excellent value for money.

I found no bugs – a few bunkers – and many hours of pleasure!



"The manual goes through virtually every aspect of the game, so that even a non-golfer can enjoy it."

"As you go down the fairway, the scene window changes to show the scene you would expect to see there."

SIMPLE ABACUS

Just for starters, some straightforward ways to approach Abacus, as developed and used by Bryan Davies.

Simple this article will have to be, because my use of Abacus is minimal, and I've never really tried to find out what the program is capable of. For five years, the QL and Abacus together have sufficed to keep my accounts in order, and it doesn't look as though tht situation will change in the near future. The number of transactions involved is small, so there is no pressure to have a faster program or computer. It has even proved possible to persuade my better half to do her accounts the same way, and she is a confirmed PC user. What we refer to her as "accounts" is the basic recording of income and expenditure data, not the compilation of an annual profit-and-loss statement, nor the preparation of the Inland Revenue return. The reason for not doing the latter items on the QL is partly that it would involve far more thinking, and some study of accounting practice, but mainly because I would be paying an accountant to give advice anyway, so he might as well produce the reports for the tax man as well.

Everything pertaining to my limited business activities could be handled by the QL, and Abacus. It's not the size of the business in terms of £, DM, etc. that matters, but the volume of transactions and the number of calculations involved, that cause the user to consider trying other computers and programs.

My running accounts files number five, two of them being in the "special interest" category. Some comment is made on the structure and use of all five files, because features of all of them may be found of general interest. Sample printouts of the files are given in the five illustrations. The data entries are not genuine ones, by the way! Each printout would normally be a full A4 page, but rows have been deleted to reduce the space taken here.

Business

The first one — VATIN — is a record of expenditure on items which are chargeable to business use, and which come into the "VAT Input" category. Since some items you buy may be partly for business purposes, and partly for normal household needs, this spreadsheet has to cater for both types. If there are only a few items in this category, it is simplest to treat each one as an exception, rather than try to insert a formula to deal with them. When you are VAT-rated, the prime purpose of such records is likely to be meeting the statutory requirements of HM Customs & Excise, which means that the VAT portion of the record has to reflect the apportionment of an expense between private and business use. It matters less whether or not the actual expense also reflects this; in my case, the records are used by the accountant for cross-checking purposes, but the original bills are the things from which he calculates what expenses to offset against Income Tax, so there's no need for my spreadsheet to calculate proportions for expenditures which are not 100% business.

Starting from the top of the VATIN page, the first character on Row 1 is ^ (hat), which is an instruction to the printer, to start printing with NLQ characters. (The PRINTER_DAT file is the same as for Quill.) NLQ is used purely to give the heading a different appearance from the data. The file name is noted because it is not difficult to temporarily forget which file you are working on when five are loaded at the same time (using the Q_Switch program-switching routine). The date after "UPDATED" is automatically changed to the current one as soon as the file is loaded, but means of a macro string which the switching program executes. When you update files at irregular intervals, it pays to record the date of the last update, in case (for example) you later think you have already made changes which you actually didn't even know about at the time.

The "TOTALS CARRIED FORWARD" Row won't be necessary if you have few transactions to enter, bearing in mind that only one quarter-year is being dealt with in one file. The character following FORWARD is ~ (tilde), which is the code used to switch back from NLQ to 10-pitch Pica. As normal, the presence of this code causes following characters on the line to be moved one place to the left when the code is removed by the printer. This minor problem could be dealt with in the printer-driver Translate entry by adding a space to the "to" string, but it has never worried me enough to cause me to make the change; basically, there is never anything in the Row, so it could be omitted.

There are formulae under the TOTAL, CHARGE and VAT headings. The

VAT INPUT RECORD,1990(FILENAME:VATIN),SHEET 40. UPDATED 13 Aug 90

DATE:	SUPPLIER:	TOTAL:	CHARGE:	VAT:
TOTALS CARRIED FORWARD		365.00	317.39	47.61
2-6	HALFORDS,CROYNGE-OIL	8.49	7.38	1.11
1-6	KALLKWIK,BARNINGUM-COPIES	1.24	1.08	0.16
2-6	HILLBROW SERVICE,CHEAM-PETROL	16.19	14.08	2.11
8-6	HILLBROW SERVICE,CHEAM-PETROL%	5.56	4.83	0.69
9-6	MEDIA VALUE,STAINES-COMPUTER DISCS	9.50	8.26	1.24
13-6	SUPERDRUG,CLACTON-BULBS	0.75	0.65	0.10
13-6	THORNTON,BRENTFORD-ENVELOPES	1.44	1.25	0.19
1-6	MEGA PUBLISHING,CHINGFORD-TRAINING ADVERT	28.75	25.00	3.75
26-6	KALLKWIK,BARNINGUM-COPY	0.10	0.09	0.01
8-7	BRIT. TELECOM-2ND QTR.%	78.56	68.32	9.73
-0.00	3RD QUARTER TOTALS	515.58	448.33	66.70

% - this sign denotes item where <100% VAT is being claimed (60/90/95%)

```
NON-VAT INPUT RECORD,1990(FILENAME:NONVAT),SHEET 18. UPDATED 13 Aug 90
DATE: SUPPLIER:                                              CHARGE:
9-6   ALL COMPUTERS FAIR,LONDON-ENTRANCE FEE                    3.00
8-6   PATEL'S P.O.-CAR MAGAZINE                                  0.60
8-6   GULF BANK-FORD SCORPIO                                  (5600)
23-6  SOUTHERN PANEL CO.,PENGE-ASTRA M.O.T. TEST               12.42
23-6  PATEL'S P.O.-STAMPS                                       1.47
23-6  PATEL'S P.O.-COMPUTER MAGAZINE                           1.50
13-6  MUTUAL INSURANCE-MERCEDES 190                           (7800)
13-6  PATEL'S P.O.-STAMPS                                       3.15
19-6  PATEL'S P.O.-STAMPS                                       2.80
1-6   PHOENIX INSURANCE-MOTORCYCLE INSURANCE%                 150.00
1-6   WORDPERFECT CORP.,U.S.A.-SOFTWARE                        80.44
13-6  BRITISH GAS-2ND QTR. BILL%                              70.23
4-7   SOUTHERN PANEL CO.,PENGE-HONDA M.O.T. TEST%               8.46
7-7   BRIT. RAIL-RET. FARE VICTORIA                             5.00

      3RD QUARTER TOTAL                                       339.07
% items have to be factored:(nnnn)items are not on VAT input list.
```

reason for having three formulae rather than two is that one cannot be sure when buying things that the receipt will contain the basic charge as well as the total, so you sometimes have to work backwards from the total to get the charge. The formulae appear first on Row 3 (TOTALS CARRIED FORWARD) and are:

(TOTAL) E3*1.15 (CHARGE) D3/1.5 (VAT) E3*0.15

That is, the total is the basic charge plus 15% VAT, the charge is the total divided by (100+15)%, and the VAT is 15% of the charge. Abacus is fairly obliging in allowing you to use "circular references" in this fashion, but don't expect miracles. When you enter a value in the TOTAL column, the formula there is replaced by the value; if you subsequently change your mind, and decide to enter a value under CHARGE, you will find the TOTAL value does not change, and is incorrect, simply because there is no formula there now.

Formulae

The formulae are needed in all Rows which are to hold values under these three headings, so the Echo command is used three times to duplicate each formula in the Cells below the headings, almost down to the bottom of the page. That is, with the cursor on Cell F3, use the form ‹F3 E ENTER F4:F64 ENTER›. F64 is used here because there are 66 lines on the page, of which the bottom 2 have other formulae.

The data entries are mostly standard ones, but the second one for "Hillbrow Service" differs in that the % sign in the SUPPLIER Column is used to indicate the expense is part-domestic and part-business. The full total and charge values are entered, but the VAT value is re-entered after the formula has calculated it. The VAT on £4.83 is £0.72, but the expense is only 95% business; with the cursor on the VAT Cell, the value is re-entered as ‹0.72*0.95 ENTER›, to give the £0.69 value. The same applies to the "Brit. Telecom" entry, the multiplying figure again being 95%.

You may use the same suppliers (or customers) frequently, and a lot of time can be saved by creating macros to insert repeated details under the SUPPLIER heading. The same applies to executing commands, such as printing the current file. The ALTKEY function allows this but, as my system had *Ice* fitted, the Icicle icon macro program was used, and this has the advantage of allowing you to create small pictures, and text descriptions, which should remind you of the functions being called up.

The penultimate line again has the hat symbol, to switch NLQ on. The three formulae should *not* be the same as used in the other Rows, in case you have any non-standard data entries, such as ones where the VAT is reduced because the expense is partly for domestic purposes. The SUM function can be used for all three columns; for example, under the TOTAL heading, SUM(D3:D64). Just to check that in doing this a multiplication error has not been generated, the B Column contains the formula (E65*1.15-D65). The value generated by this formula should be 0.00, since TOTAL = CHARGE*1.15. In practice, if the BLANK IF ZERO option on the DESIGN screen is set to YES, nothing at all may appear in this cell.

While on the subject of the DESIGN screen, simple spreadsheets like these are unlikely to be slow in being updated, so the AUTO-CALCULATE ON INPUT function can be set to YES. This setting causes formulae to be recalculated each time you press ENTER to add a value; in a complicated spreadsheet, with many formulae, the recalculation time may be great, and it is then preferable to change the setting to NO, and use the XECUTE function just the once, after *all* data has been entered.

Setting BLANK IF ZERO to YES avoids having a mass of 0 characters printed out on rows where no data has yet been entered. The CALCULATION ORDER setting is ROW by default, and that is appropriate here. form feed between pages can be set to NO, to allow manual positioning of the paper on a dmp printer, to get the maximum number of lines printed. the LINES PER PAGE OF PRINTED PAPER is set to 66 if you have 66 lines on the spreadsheet which you want to print. the MONETARY SYMBOL is of no interest if you are trying to save space, as you won't want £ signs printed all over the place. PRINTED PAPER WIDTH should be set to the maximum number of characters you want printed. My usual setting for 10-pitch Pica print is 82, but that rises to 136 where 17-pitch Condensed Pica is used.

Percentage

To round off the description of the VATIN spreadsheet, the last line has the ~ character at the start, to switch back to Pica characters, and a note to explain the significance of the percentage sign in the SUPPLIERS column. Your accountant may see the document, and not be aware of your "code"; after a time, you may well forget what % figures you use and need reminding, anyway.

VATIN contains only items on which VAT was paid. It seemed simpler to put items on which no VAT is charged into a separate sheet — NONVAT — and that is the second one illustrated. You could combine the two, but that would mean doing a bit more thinking about formulae, and that didn't seem worthwhile. Whether or not it is strictly correct to lump together expenses where the VAT Rate is 0% with those where there is no VAT liability at all. I don't know, but it is convenient to do so; it is perhaps more important to make the distinction on invoices. In case some Abacus users haven't realised it, it should be noted that all five sheets could be

combined into one, but there are some objections to doing that.

Bearing in mind that my spreadsheet set-up was started when only microdrives were in use, it was potentially dangerous "having all my eggs in one basket". There would have been a good chance of problems with the one sheet at some point, because of the size of the file, and losing that would have meant losing all my accounts data, rather than a portion of it.

It is rather irritting having to keep moving about in a large sheet, to change from one aspect of the accounts to another; cursor movement is not exactly lightning-fast. When you want to pring part of a large sheet, you have to specify the top left and bottom right cell locations; not a big task, but you only have to accept what is offered when each of the five spearate sheets covers one page of paper.

There are some items on the NONVAT printout that need comment. The "Gulf Bank" entry is for a car purchase, and VAT is not paid on the purchase of a secondhand car, which is why such entries do not appear in the VATIN sheet. However, putting in the total amount paid for the car would create a false impression of the level of expenditure, because there is not a similar amount in the VATOUT sheet.

Car sales

The oddity of VAT accounting for car sales is dealt with below. Suffice it to say here that the car costs are put in brackets to keep them separate from other non-VAT expenditures. As with the VATIN sheet, some expenses may be only partially for business purposes, and the same % sign convention is used here to identify them.

The item "WordPerfect Corp." is listed as a non-VAT expense because (sometimes) nothing may be charged on an item purchased from outside the EEC; a charge should be applied, but Customs & Excise do not always do this. The note on the last line indicates that I do not actually apply the multiplying factor to values in the CHARGE Column myself, but leave that for the accountant to do; as pointed out above the "(nnnn)" items (cars) are trated differently to the rest. The CHARGE items can be totalled using SUM(D3:D64); the items in brackets will not be summed. No formulae are required in this sheet.

VAT registered

Sheet three is for income, and is called VATOUT, to reflect the VAT liability on invoiced goods or services. This, unfortunately, is the easiest of my sheet to maintain — there are not many entries to be made! Generally speaking, all the invoices for a VAT-registered person will include a VAT figure, but there can be VAT-exempt items. These are not the same as Zero-Rated items, which should be recorded as being charged at 0% VAT, rather than no VAT entry being made at all.

An example on the illustration is instruction manuals, provided in connection with training in the use of word-processor programs; the manuals are classified as being eligible for VAT, but at the 0% rate. The REFUND item deals with an allowance of £2.50 given against a manual purchased at one training session, when a further session was undertaken. As books are zero-rated for VAT, the charge and total values are the same. The last two entries involve the sale of cars, and the sale prices are not listed in the values columns; only the gross profit figure is entered. This matter is dealt with below; for my own information, the actual sale prices are given in the entries under the SUPPLIERS heading, where they do not enter into the spreadsheet calculations. Since most entries will involve the addition of VAT at 15%, two simple formulae can be used. The VAT figure is 15% of the basic charge, and the *total* charge is therefore 100+15=115% of the basic charge. The formulae for the VAT and TOTAL Columns are, therefore, of the form:

(VAT) E3*0.15 (TOTAL) E3*1.15

This is essentially the same as in the VATIN sheet, except that the charge value is always known, so no formula is needed for it. To get the totals for the columns, the CHARGE column formula is SUM(E3*E64), whereas both the VAT and TOTAL columns use the same formulae as the data rows above them, and the echo command is used for all the rows to the bottom of the page. Th odd column down the right side, with some question marks in it, is a memory-jerker; question marks are automatically entered in all cells of this column initially, and are subsequently removed manually (using ‹SHIFT-" ENTER›) as — and when — payment is received for invoices.

The first three sheets cover the basic requirements for monitoring expenditure and income in a small business. To meet the requirements of HM Customs & Excise, the figures on the VATIN and VATOUT sheets have to be totalled quarterly. While they are sufficent to meet legal requirements, they do not provide a great deal of "management informtion". You can see if income in a quarter is not equal to expenditure, but there is no breakdown of where money is going to, or coming from.

The need for sheet four (CARSLS) arose out of the fact that I have for several years bought and sold cars, and that is a business which involves large expenditures and, potentially, significant losses. While cars may not be your idea of a sensible business to be in (it is almost a dead one for many dealers now), you may well have one particular line of business which merits more-detailed attention than the rest.

It is the things that require appreciable expenditure which need monitoring closely; work which does not entail putting out money "up front" should not expose you to significant loss potential, and can often be largely ignored from a profit-and-loss point of view.

An instance in my case is writing service manuals; there is a considerable expenditure of time, and a computer system is almost essential, but the expenditure on

VAT OUTPUT RECORD,1990(FILENAME:VATOUT),SHEET 22. UPDATED 13 Aug 90

DATE/	INVOICE/	CUSTOMER:	CHARGE:	VAT:	TOTAL:	
7-6	29	GLOSSY PUBS.-ARTICLES	100.00	15.00	115.00	?
12-6	30	COMMONWEALTH BANK,LONDON-TRANSLATIONS	15.00	2.25	17.25	
15-6	31	COMMONWEALTH BANK,LONDON-TRANSLATIONS	130.00	19.50	149.50	
16-6	32	LOOKGOOD MAGAZINES-ARTICLE	75.00	11.25	86.25	?
17-6	33	MARGARET FOULDS,BOW-COMP. TRAINING	41.00	6.15	47.15	
17-6	33	MARGARET FOULDS,BOW-REFUND INV. 28	-2.50		-2.50	
20-6	34	SUPERWASH INC.,READING-SERVICE MANUAL	1100.00	165.00	1265.00	
22-6	35	FREEZRITE LTD.,EPSOM-USER INSTRUCTIONS	125.00	18.75	143.75	
5-7	36	ANKARA MINING,RIO-COMP. CONSULTANCY	500.00	75.00	575.00	?
13-6	37	UPFRONT MOTORS,WIGAN-MERC. 190 (8000)	173.91	26.09	200.00	
9-6	38	JN ENTERPRISES,SOUTHEND-SCORPIO (5650)	43.48	6.52	50.00	
		3RD QUARTER TOTALS	2300.89	345.13	2646.03	

the latter has been made and amortised over several years, and the actual investment in materials for any particular job is not large.

By using condensed print (17.14 characters per inch) on the Kaga dot matrix printer, it is possible to print out one year's profitability figures for cars across an A4 page. This is possible only by keeping column widths to the minimum. With a maximum of 132 characters printable, and 12 months plus the totals and the expense/income categories, there are less than 10 characters available per column on average.

There's no room for a margin either side, other than the areas the printer will not print in (about 1.5 cm. total).

Totals

Assuming the figures only get into nine characters (including the decimal point and 2 places to the right of it) in the Total Column, and are no greater than eight characters in any month, there were 14 characters left for the descriptions of expense/income categories at the left. Not feeling able to shorten the descriptions to less than 15 characters, I've relied on some months needing only seven characters. It subsequently became clea (thanks to prompting from a reader) that the Kaga will give 136 characters on a line if you initially set the right margin, explicitly, to give that number; this can be done in the Preamble of the Pinter_Dat file. The condensed character code has to be set first, to allow the maximum margin to be set.

If you use the same Printer_dat file for all spreadsheet printouts (as I do), and normally print with 10 cpi or 12 cpi, the Preamble must contain the codes to switch condensed on, set the maximum margin, then change to the normal character size (10 cpi in my case). This may be a weirdity of the Kaga printer, which defaults to permitting a shorter line with condensed characters than with any other size.

The sheet is split into two sections, because some cars are bought and sold, whereas others are merely sold on behalf of someone else, on a commission basis. There are eight expense/income categories listed for the former, and seven for the latter, of which toward one respectively utilise formulae. It is clear that selling price less buying price gives gross profit, so the formula required for Row six is of the form (B5-B4). As with the VATIn and NONVAT files, expenditures are separated into two piles. Expenses on which no VAT is paid are put in the "EXPENSE(NO VAT)" row, and the VAT expenses are entered as totals under "EXP.(INCL. VAT)". The "VAT(IN EXPENSE)" row has the formula B8/1.15*0.15, to extract to 15% from the total expense. "VAT(IN GP)" has the formula B6/1.15*0.15, to produce the Output VAT figure which has been paid (see next paragraph for explanation).

Unlike other Output VAT figures, which are balanced against Input VAT at the time a quarterly VAT Return is completed, the VAT paid on profits made from selling cars does not have any (direct) balancing figure and, instead, it is counted as an expenditure against Income Tax liability, which is why it appears in the formula for "NET PROFIT".

Expenses

The "NET PROFIT" is what's left after paying VAT and cost-of sales expenses, so the formula used to calculate it is ((B6-B7-(B8-B9)-B10); as VAT on expenses is directly reclaimed through VAT Returns, it has to be removed from this calculation.

The used car trade is possibly unique from the VAT point of view. Instead of paying VAT on cars you buy, and charging it on those you sell, normal practice is to buy and sell without VAT being included on the invoices, and to calculate Output VAT from the difference in prices. That is, selling price — buying price over 1.15*0.15 gives the Output VAT figure. Put another way, the Gross Profit on a car deal is equivalent to the total charge you would make on an invoice for other goods or services and is, therefore, 115% of the basic charge; to get back to the basic charge, you divide by 115 and multiply by 100. You then take 15% of

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	SALES(OWNED CARS), 1989 UPDATED 14 Aug 90									FILENAME:CARSLS				
2			January	February	March	April	May	June	July	August	September	October	November	December	TOTALS
3															
4	BUYING PRICE		4500.00	12900.00		6750.00			3200.00		20550.00	6250.00			54150.00
5	SELLING PRICE		4550.00	13700.00		6900.00			3300.00		21000.00	6325.00			55775.00
6	GROSS PROFIT		50.00	800.00		150.00			100.00		450.00	75.00			1625.00
7	EXPENSE(NO VAT)		1.60	18.42		4.50			3.20		5.10	1.80			34.62
8	EXP.(INCL. VAT)			94.93		5.00					135.00				234.93
9	VAT(IN EXPENSE)			12.38		0.65					17.61				30.64
10	VAT(IN GP)		6.52	104.35		19.57			13.04		58.70	9.78			211.96
11	NET PROFIT		41.88	594.68		121.59			83.76		268.81	63.42			1174.14
12															
13															
14	----------														
15															
16	SALES(COMMISSION)														
17			January	February	March	April	May	June	July	August	September	October	November	December	TOTALS
18															
19	SELLING PRICE					9500.00			12500.00					14500.00	36500.00
20	CHARGE(INC VAT)					115.00			115.00					143.75	373.75
21	EXPENSE(NO VAT)					3.40			1.80						5.20
22	EXP.(INCL. VAT)					5.00									5.00
23	VAT(IN EXPENSE)					0.65									0.65
24	VAT(IN CHARGE)					15.00			15.00					18.75	48.75
25	NET PROFIT					92.25			98.20					125.00	315.45
26															
27															
28	----------														
29								TOTALS FOR YEAR:		GP	1998.75	2.17		SOLD	92275.00
30								(-INS.)	800.00					0.75 NET	689.59
31												% ON SELLING PRICE			

VAT RECORD FOR VEHICLES SHEET 3 UPDATED 14 Aug 90 FILENAME:CARVAT

MAKE/MODEL	REG. NO. DATE BOUGHT/SOLD	PRICE PAID/SOLD		PROFIT	VAT	COMMENTS
TOTALS BROUGHT FORWARD		177492.50	249560.00	15981.23	2165.92	
VOLVO 240GLE EST.	B818 RGK 23-5-89/23-5-89	5300.00	6000.00	700.00	91.30	BANK
VOLVO 480ES	E181 VGH 20-5-89/24-5-89	---------	9200.00	125.00	18.75	BANK..NOT EXCITING
VOLVO 740GLE	B112 CPC 27-5-89/1-6-89	6300.00	6500.00	200.00	26.09	INS..DROVE NICELY
FORD SIERRA 2.0I GHIA EST	D928 FFI 31-5-89/1-6-89	8300.00	8350.00	50.00	6.52	PAID TOO MUCH-OLD SHAPE
FORD SCORPIO 2.8EFI	C735 DIY 10-6-89/10-6-89	8300.00	8400.00	100.00	13.04	MORE PAINT THAN EXPECTED
TOTALS TO DATE		205692.50	288010.00	17156.23	2321.63	

that figure to give your VAT liability.

A deal in which you pay £1,000 for a car and sell it for £1,115 incurs a VAT liability of £15. The actual gross profit is £100, not £115. This is why the figures on car sales in the VATOUT sheet may look suspiciously low to the uninitiated, and why the buying of cars is listed under NONVAT rather than VATIN. Those who complain about the prices charged by car dealers, may be unaware that a sizeable slice of the apparent profit goes in VAT, and that the expenses incurred in preparing the car for sale (typically several hundred pounds) have to be deducted from the gross profit after VAT has been paid, not before.

As an attempt to figure out what money is actually made, the bottom three lines of the CARSLS sheet contain some more formulae. To the right of the cell denoted by "GP" is the formula N6+N20, which is the total of GROSS PROFIT and CHARGE(INC VAT) — the gross profit from all selling activity. That's the starting point; from there on things just get worse. To the right of "SOLD" is the formula N5+N19, giving the total value of all cars sold. To the right of "(-INS)" is the cost for insurance on cars, for a full year; obviously, as this is deducted at the start of the year, the picture looks grim right away, but it should improve as the year goes on. To the left of "SOLD" is J29/N29*100, which give the percentage gross profit on the total turnover. To the left of "NET" is N30/N29*100, which is the net percentage profit on turnover. To the right of "NET" is (N11+N25−H30), which is the actual net profit obtained by adding the two NET PROFIT figures together and subtracting the insurance cost.

The details of buying and selling cars may be of little concern to the majority of QL users, but the general layout and construction of the profit-and-loss sheet should have some applicability to almost anyone making more than minimal use of Abacus.

There is another VAT requirement specific to car dealing, and that is illustated by sheet five CARVAT. It is a legal requirement to keep a log of vehicles purchased and sold. Information that should be recorded includes purchase and sale prices, vehicle registration number and model, and the Output VAT liability. As this is a running record, there has to be the TOTALS BROUGHT FORWARD Row. The values volumns combine the VATOUT and NONVAT entries for each vehicle. There is one entry which does not fit the pattern, and that is for the sale of a car on a commission basis (Row 7). As such deals do not involve the middleman in spending or receiving money for the vehicles concerned, the transactions are of a simple, service nature and are treated as a normal VAT item, with basic charge plus VAT being equal to total charge. The VAT calculation formula used is G4/1.15*0.15, but any commission sales have to be entered individually as values in each Column.

Summing the entries

The TOTALS TO DATE Row has three formulae, each summing all the entries above that Row — eg SUM(E4:E64). In a sense, this is a general inventory file, recording the stock, buying and selling prices, date-in and date-out, and profit figures. As such, it could be applied to any merchandise where only limited quntities are involved. Combining as it does expenditure, turnover, gross profit and VAT liability in one sheet, it is useful as a quick guide to how business is going, without having to look at the separate expense and income sheets and do some mental arithmetic.

A time-saving procedure desirable for all sheets is to create masters — all the format and formulae details, without any data — which can be loaded at the start of a new period, to save having to delete data and re-insert formulae. Take care with file names, to avoid overwriting important data. For example, use something like VATIN_MT_ABA for the VAT input master.

There is another category of record which is not covered by the five sheets discussed so far. As a result of the rapidly-worsening payment record of one of my clients, I was driven to create a database-cum-spreadsheet solely concerned with that one client. Sad to say, I could not think of a really satisfactory way of displaying the information required with a QL program. To some extent *Abacus*, *Archive* and *FlashBack* have some of the required capability, but *Easel* would have had to be included also, to get easily-interpreted, graphical "situation reports". This multi-program approach would have been far too complicated and time-consuming, so I invested in a PC program which combines the desired features of each of those four programs. Each transaction can be stored as a single record (as in Archive or FlashBack), formulae can be used to reduce the amount of repetitious keying-in of data (as with Abacus), and the data can be automatically plotted in the form of graphs (as in Easel).

Even better, several different "views" of the same data can be displayed concurrently on the screen. It was quite surprising what a new insight the graphs gave on the subject of a bad payer. The decline of the situation with time became clearer when plotted as a graph of (payment date — invoice date) against calendar quarter. The variation in the number of items invoiced, and of the corresponding invoice values, with time became more obvious. A simple formula revealed a decline of profitability per transaction over a period of a few years — something which had not been apparent from looking at the figures alone.

So far, the QL programming community doesn't seem to have thought such a program worth producing, more's the pity. If you really want to get fancy, and spend lots more time and money, you need a "relational" spreadsheet/database program, which allows changes on one sheet to be reflected in related items on other sheets, even though the latter are not loaded at the time the changes are made. This is effectively the same as putting all the sheets discussed into one, big sheet, with all necessary formulae on it. When you get to that stage, you might find that computing has become your main occupation rather than an aid to running your business; the relative simplicity of QL programs and hardware can be a great blessing.

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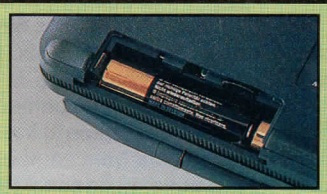
The Portfolio's built-in text processor program includes word wrap, line and column count, string search, in fact most of the functions you would find in a word processor. It handles printer and word processor control codes and allows easy transfer of files between Portfolio and your desktop PC.

SPREADSHEET

For real calculating power, Portfolio has a Lotus 1-2-3 compatible spreadsheet built-in. It has 127 columns x 225 rows and reads/writes Lotus V1.0 and V2.01 files, so you can transfer data to and from Lotus 1-2-3 on your desktop PC. The Portfolio's 256K ROM includes MS-DOS and PC BIOS compatible systems software.

MEMORY CARDS

Portfolio can store and retrieve data and programs from its own RAM, or from small credit card size memory cards, that slot into its built-in card drive. The cards are available in three sizes, 32K, 64K and 128K, so you can carry a library of data in your pocket. The card drive also accepts ROM cards, which can contain commercial or custom software.



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WHY LASER PRINTERS?

New laser printer owner Bryan Davies sums up the pros and cons from the experience.

It might seem odd to suggest using a £100 QL to generate output for a £2000 printer, but it always seems to be add-ons which cost the money, not the computers, and drivers for laser printers will gradually start to appear in QL software. In fact, two such drivers are already available with *text*[87].

Before mentioning some technical features of laser printers, a few comments on why one is desirable, or necessary: daisywheel printers have long been the means of getting good-quality printed text output and, if standard-sized text is your only requirement, the daisywheel is probably still the best machine for the job. However, apart from the drawbacks of slowness and noise, daisywheel printers are relatively expensive.

Dot matrix

Dot-matrix printers are much better for all-round-home-and small business use, and they are cheaper, but they really do not produce what one could call good-quality output, whether text or graphics. Nevertheless, they can handle graphics, which daisywheels cannot.

The laser printer gives excellent graphics output, and can handle text in a wide range of sizes and styles, with quality close to that of a good daisywheel. If you use graphics, dtp, or cad cam software, and need something better than the typical "home" newsletter standard of document, the laser is the obvious way to get it. The output from a laser printer can be used as a "master" for making duplicate copies. Alternatively, since the laser is fast when making multiple copies, you could use it for the copying job as well (but it is likely to be expensive). For most of us, I think dtp would be the reason for thinking about a laser printer.

In rough terms, the operating mechanism of laser printers is comparable to that in photocopiers. You have a drum, which is charged electrostatically to match the input page from the computer, and onto which powder is then attracted by this charge; the paper is brought into contact with the drum and powder (toner) and the latter is transferred to the paper as an image, which is set by heating. The basic 'engine' of any laser printer almost certainly comes from one of three manufacturers – Canon, Ricoh or Kyocera – so the differences between printers are in the electronics, case construction, style, and so on.

We know that modern copiers produce very good results, and the same is true of laser printers. Equally, some of the same problems occur, such as uneven coverage of large black areas and paper jams. The mechanism is rather large and heavy, and complex, so that the laser weighs more, and takes up a lot more space, than either the dmp or the daisywheel. When looking at sales information, don't omit to add the size of input and output paper trays to the overall dimensions. Standard paper input trays hold 50-250 sheets, and most people will not need optional, higher-capacity trays. Typical lasers occupy about 45 x 75 x 25 cm (width x depth x height) and weigh 10-30 kgs.

The electronic side is very important in a laser printer, and the approach taken to transferring the data from computer to paper varies quite considerably with the manufacturer and model. Generally, the laser contains ram memory, the basic amount being 512 KB. As with dmp printers which have an input buffer, the whole page of data is transferred more-or-less instantaneously, so that the printer does not have to 'piece together' a page.

Unlike dmp printers, lasers normally come with both serial and parallel interfaces, so you shouldn't need to add an interface to connect to the QL serial port. Normal connection to a PC would be via the parallel port, which requires less thought and should give faster data transfer.

As might be expected, graphics images require a lot more memory space than does standard text; 512 KB is sufficient for full pages of text, and for text with limited graphics, but you can find that the output becomes mixed-up and useless when the graphics content of pages rises. When using dtp software, it is likely that 1-1.5 MB of memory will be required, not only to provide reasonable output speed but even to get output at all with some lasers. Additional memory costs £150 upwards per 1 MB.

The actual "computing" capacity of the average laser printer is not great, being limited to handling the input data page-by-page, but there are certain types which do have considerable computing power. The obvious category is the PostScript printer, although that should not be of anything other than passing interest to the QL user; it seems unlikely that any QL software will generate output suitable for PostScript.

PostScript is a language, comparable to Basic and quite readable in English; pages are described in it, so that they are sent to the printer as a set of program instructions rather than a "bit-map image". This allows much greater accuracy in the printed image, at the expense of requiring the additional computing capacity, and much more memory. The bit-map image that is normally used in laser printers can be compared to reading data off the screen in a fixed order. As with the screen image, you have the problem of lines which are anything other than vertical or horizontal being jagged, because they consist of dots of noticeable size. When text characters are enlarged from their basic, stored size, the jaggedness is emphasised. DTP users will be familiar with this problem, and lasers as such do not get you away from this, but there are various dodges that may be provided with printer or software to ameliorate the condition.

A basic laser printer tends to have a distinctly limited range of character sets and enhancements, quite possibly less than your existing dmp has. You get around this problem by buying 'fount cards' with extra character sets on them (hardware) or by downloading sets from the computer. Advantages of fount cards are that their character sets are available immediately, without time being lost transferring them from computer to printer, as is the case with downloaded software sets, and you do not need to have extra memory in the printer to hold them. Fount cards can cost over £100 each, though. The price, per set, of software founts is usually lower.

Emulation

'Emulation' is a word that – for us – is used in connection with the *Conqueror* PC-emulation program for the QL; laser printers have built-in hardware emulations. Unless a printer has "Hewlett-Packard LaserJet II emulation" it may be of little use; you can virtually guarantee that any major PC program provides a printer-driver for the HP LaserJet II, but it may well not have a driver for a particular printer's 'native' mode. A case in point is the two drivers now offered for text[87]. The one driver has HPLJ emulation and should, therefore, be usable with most laser printers. The other driver is specifically for the Epson GQ-5000 laser; for some odd reason, PC software houses have decided not to support Epson's efforts in the laser printer field, despite having for many years supplied drivers for Epson dmp printers.

If your program does not have a driver for your particular laser, it may prove impossible to utilise some of the important features of the printer. For example, the GQ-5000 has 'scalable founts', meaning that the basic size of certain character sets can be altered, in this case between 3 and 240 'points' (a 'point' being the print-trade term for a height of 1/72in; a 72-point character is 1 inch

high), but the scaling feature works only in native, GQ mode, and is unavailable when the HPLJ emulation mode is used.

Another emulation which may prove worthwhile is that of the FX-80 Epson dmp, since virtually any software provides an 'Epson-compatible' (ie FX-80) driver. Using this emulation, and your normal dmp driver (if your printer is basically Epson-compatible), you should be able to print existing documents successfully. This is something I have not been able to try yet, but I shall report later on the results of attempts to print from the usual QL programs, using the drivers already set up for my Kaga-Taxan dmp.

It should be noted that existing documents may require extensive reformatting to suit a laser printer. For instance, I replaced a Kaga driver, used when creating a 140-page manual, with an HPLJ driver, and found that the text became a considerable mess, simply because the WP program being used did what it could to find founts in the laser to match those already selected for the dmp, with the result that many sections of large print (less than 10 characters per inch) were changed to a size roughly the same as condensed print (17cpi). To put it mildly, the workload this apparently-simple conversion created was a pain. An emulation that will not interest most users, but could be very useful for cad cam purposes, is HPGL – Hewlett-Packard Graphics Language – which allows work prepared for a plotter to be tried-out on a laser first.

Laser printers are not cheap to run. Whereas a dmp may run all year at the cost of a few pounds for electricity, ribbons and paper, and never require servicing, the laser has some expensive consumables. First, there is toner, which is used in proportion to the amount of black placed on the paper. Manufacturers tend to quote the use of toner on the basis of no more than about 5% of the paper actually being 'blacked'; think about a typical page of text, and you will realise that this is a reasonable estimate, but a page of graphics eats up the toner at a much greater rate. The lower end of the cost scale for toner is about £15, and that is for about 1-2,000 pages of text. Some machines require toner that costs about £60 per refill. Trying to cut costs by buying non-branded toner is a risky business, as manufacturers may not honour their guarantee unless their own consumables have been used, and there is always the possibility that the cheaper product will cause problems.

Guarantees usually include on-site service for 1 year, and this is a measure of the likelihood, and expense, of service for lasers. I was quoted over £200 for an extended guarantee for 2 years after the basic period. The drum itself wears, and can get damaged, and the cost is around £100. The home user may never use the machine enough to have to pay this cost, but 100,000 pages is not all that much if you have regular business use for the printer; bear in mind the vast amount of paper that is wasted. Drums should last a few hundred thousand pages. As yet, I'm not sure whether paper costs are significantly different from those with a dmp; my cost of £20 per 2,000 sheets of continuous 70 gsm stationery for a dmp is about the same as the £10 per 1,000 I've seen quoted for cut 80 gsm "normal output paper", and photocopier paper should be acceptable, at a lower price.

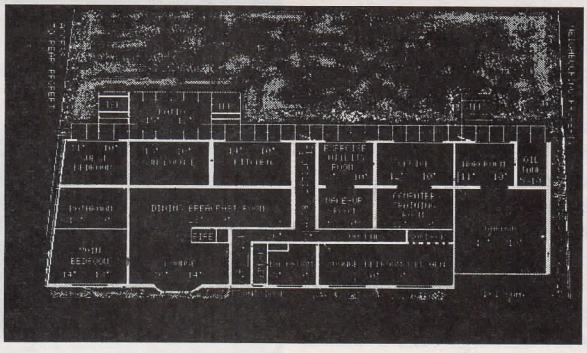
So to the big question – how much can I get one for? For starters, forget the prices you see advertised by main dealers, because you might prefer to buy a decent second-hand car rather than pay in excess of £2,000 for a printer. Laser prices are coming down steadily, albeit not tumbling. In some cases, well-known brands of laser are selling now for about half the price they cost a year ago. Forget PostScript, because you shouldn't need it for the QL and, if you eventually need it for some other computer, you can buy an add-on hardware or software PostScript emulator.

Unless you plan on extensive graphics work, you should be able to manage with the basic 512 KB of ram; this, also, is almost invariably expandable at a later date, usually up to 4-6 MB, and memory prices are coming down. If you do need more for graphics straight away, an extra 512 KB or 1 MB should be sufficient. Because the pace of change is typical of Japanese high-tech products, models are superseded almost yearly, so last year's model may be offered at a large discount, by mail-order suppliers. For a base model, suitable for use with text[87] and the QL, you need pay no more than £700 plus VAT. With an additional 1 MB of ram and more founts, you should still be able to keep the price to around £900 plus VAT, and these figures include 1-year on-site maintenance coverage.

Model codes are given in ( ) after Service Numbers.
Models which use a part are shown in the MODELS column.
Parts marked NS are not shown on the parts breakdown drawings.
Parts marked NA are not available as replacements.
Contact Service Department about parts with PG -- .

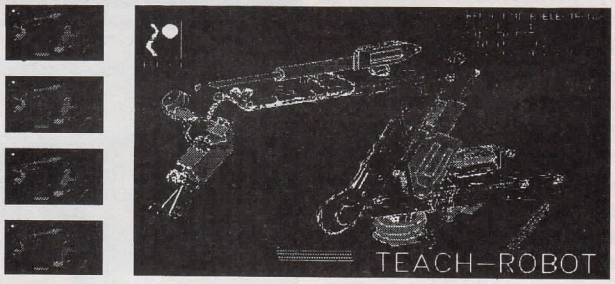
TF 15 00/2500 (A) 00/2501 (D) TF 14 00/3100 (B) TFS 15 00/3101 (E)
TFT 15 00/3700 (C) 00/3701 (F)

ORDER NUMBER:	PG:	DESCRIPTION:	MODELS:
-00.01	NA	FOAMED CABINET	A-F
00/2500-00.00-00.18	02	FOOT	A-F
00/2500-00.00-00.20	10	UPPER TRIM	AC
00/2500-90.00-00.20	09	UPPER TRIM	E
00/2501-00.00-00.20	10	UPPER TRIM	DF
00/3100-00.00-00.20	09	UPPER TRIM	B
00/2500-00.00-00.26	06	UPPER AIR GRID	A
00/2501-00.00-00.26	06	UPPER AIR GRID	D
00/3100-00.00-00.26	06	UPPER AIR GRID	B
00/3100-90.00-00.26	06	UPPER AIR GRID	E
00/3700-00.00-00.26	06	UPPER AIR GRID	C
00/3701-00.00-00.26	06	UPPER AIR GRID	F
00/2900-00.00-00.31	01	BRACKET FOR 00.32	A-F
00/2500-00.00-00.32	01	DOOR HINGE	A-C
00/3100-00.00-00.32	01	DOOR HINGE	D-F
00/2500-00.00-00.34	01	COVER FOR HINGE HOLE	A-F
01/2500-00.00-00.35	02	DOOR HINGE, LOWER RIGHT/UPPER LEFT	A-F
00/2500-00.00-00.44	03	UPPER CROSS-BRACE	ACDF
00/2900-00.00-00.44	01	BRACING FOR 00.20	BE
00/2800-00.00-00.50	00	SELF-TAPPING SCREW FOR 00.35	A-F
00/1460-00.00-00.72	01	HOLDER FOR THERMOSTAT SENSOR	C
00/3600-00.00-00.72	01	HOLDER FOR THERMOSTAT SENSOR	F
00/2700-00.00-02.10	09	EVAPORATOR COMPARTMENT FLAP	AC
00/2701-00.00-02.10	09	EVAPORATOR COMPARTMENT FLAP	D-F
00/3200-00.00-02.10	09	EVAPORATOR COMPARTMENT FLAP	B
00/2900-00.00-02.17	04	UPPER SUPPORT STRIP FOR 05.02	A-F
00/2900-00.00-02.18	04	LOWER SUPPORT STRIP FOR 05.02	A-F
00/2901-00.00-02.28	00	LARGE SUPPORT STUB	D-F
00/3000-00.00-02.28	00	LARGE SUPPORT STUB	A-C
00/2900-00.00-02.29	00	SMALL SUPPORT STUB	D-F
00/3000-00.00-02.29	00	SMALL SUPPORT STUB	A-C
01/7100-99.00-02.40	18	UPPER BASKET	A-F
00/2900-99.00-02.43	17	LOWER BASKET	A-F
00/2800-00.00-02.47	02	ICE SCRAPER	ACDF
00/2901-00.00-02.66	01	BASKET STOP	D-F
00/3000-00.00-02.66	01	BASKET STOP	A-C
00/2900-00.00-02.69	00	SOCKET	A-C
00/1308-00.00-02.77	00	BUSH FOR 02.10, RH	A-F
00/1308-00.00-02.78	00	BUSH FOR 02.10, LH	A-F
00/2900-00.00-02.96	02	HOLDER FOR 02.98	ACDF
01/7100-00.00-02.97	02	HOLDER FOR 02.98	ACDF
00/2900-00.00-02.98	00	RECORD CARD FOR 02.43	ACDF
01/7100-00.00-02.98	00	RECORD CARD FOR 02.40	ACDF
00/3100-00.00-03.07	00	WASHER FOR 00.35	BE
00/2500-00.00-03.08	00	HINGE BUSH	A-F
00/2500-00.00-03.09	00	WASHER FOR 00.32	ACDF
00/3100-00.00-03.09	00	WASHER FOR 00.32	BE
00/2500-00.00-03.11	11	DOOR HANDLE	AC
00/3101-00.00-03.11	11	DOOR HANDLE	DF



TEACH ROBOT

This is a German-made device, with potential as a teaching aid. The hope was to interest teaching establishments in the U.K. in a version of the robot which could be used with IBM-compatible PC computers. We demonstrated it at a major educational exhibition at the start of 1989, and it drew a reasonable amount of attention, but no follow-up interest at all. The location of our stand -- immediately above those of Acorn and Research machines -- illustrated clearly what people where there for. To spend the Big Money, not to bother with minor, £1,000 projects. The drawings below were used, in semi-animated form, as part of the on-screen presentation we used at the exhibition.



SOFTWARE FILE

GRID

John Shaw gets involved in an interactive game of 'battleships' with nuclear missile instead of cannons

INFORMATION:
Program: Grid
Publisher: Xiph Computing Of America
c/o Sharps
Box 326
Mechanicsville
VA 23111
USA
Price: £13.95 mdv or 3.5 in floppy.
Suitable for 128K machines.

Grid 1.1 is described in "An action-text interactive game consisting of a limited exchange nuclear war simulation with a high quality algorithm using precise formulae and full error trapping".

I would describe it as "Battleships. . . in a World War III scenario".

The essence of the game is that between 2 and 10 bases may be set up (a maximum of two per player is recommended), each within the 100 x 100 playing area. The object is to bomb your opponents' bases by inputting the co-ordinates such as 20,44.

In this program, however, there are a number of enhancements over the original "Battleships" concept.

Firstly, you may bolster your own bases against your opponent's nuclear attack by sacrificing an amount of "base energy". Similarly, you may repair your own bases following damage.

Secondly, you have three types of missiles to deploy in order to destroy your opponents bases, viz a Probe missile which will detect bases within a 20 grid area, a Cruise missile (three megatons, max) and finally a Ballistic missile with no maximum megaton limit (subject to your own reserve quota).

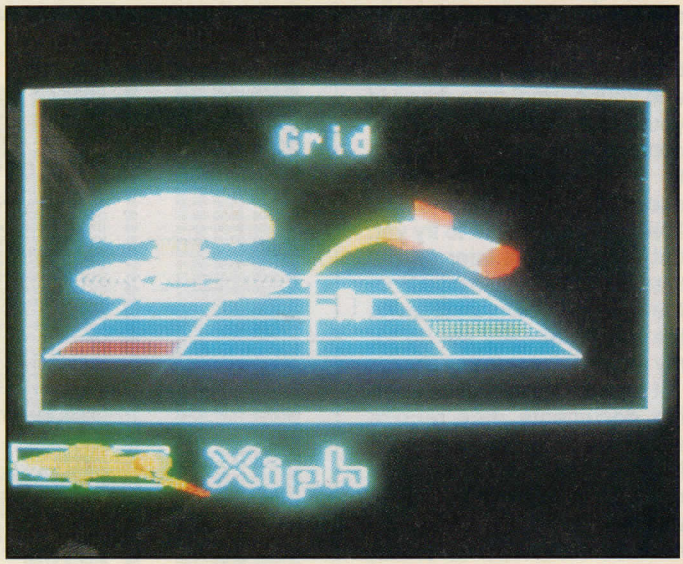
Finally, you have a radar screen which enables you to plot the direction from which the ballistic missiles came, so that you can detect the location of your opponent's bases. In making your assessment, you must take into consideration the effects of both wind and rain which affect the missiles' vapour trails (the weather status is displayed on the screen). The radar cannot unfortunately detect the trails of Probe or Cruise missiles, only their points of impact.

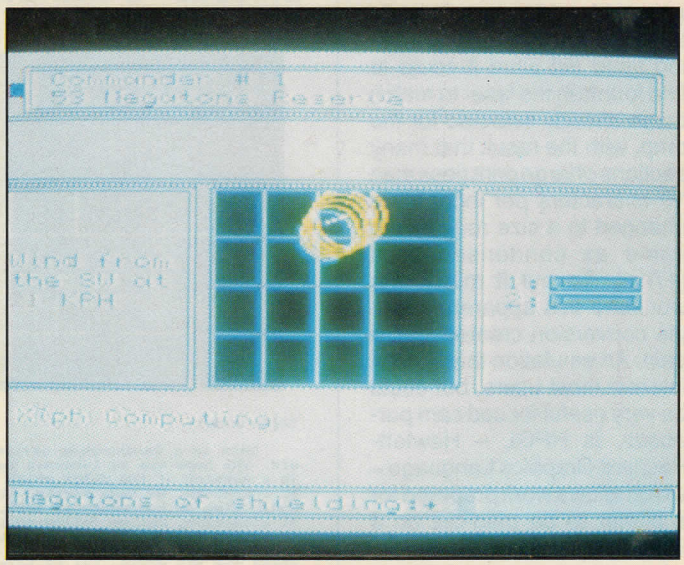
The screen also has the following: a status indicator showing the condition of your base, an energy indicator showing the amount of energy units available to you, a missile screen showing the launch status, a radar support screen giving shielding and missile statistics, and a collective indicator giving continually updated status of all bases at once.

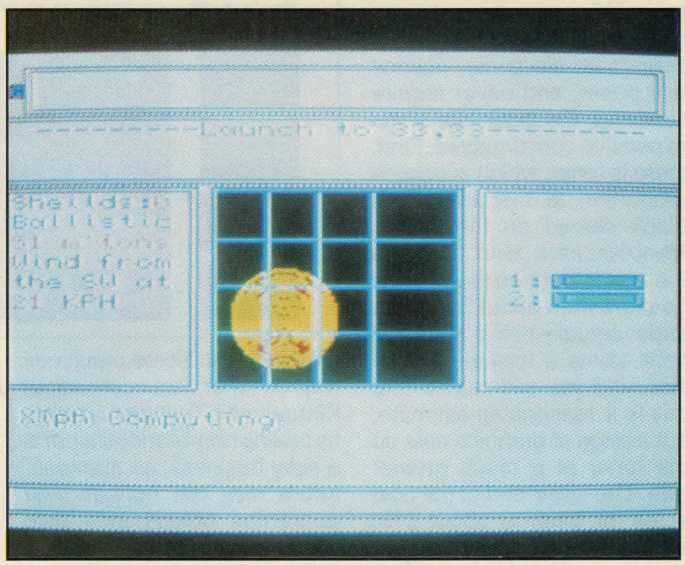
The game continues in time honoured fashion until all your opponents bases are destroyed or you yourself are "Nuked"!

The program itself has a good visual display and appropriate sound effects (which may be switched off). Irritatingly, though, it takes over a minute to load. The author issues what he considers to be "Rules of engagement" suitable for Official Tournaments.

So, if you are thinking of something for Christmas to occupy the minds of 10 to 16 year olds, then you could give serious consideration to this program. The asking price of £14.00 puts it in the bracket of "Value for money" when set against the price of other similar QL games software.







P·R·O·G·S

If you have a program worthy of consideration, send it to 'The Progs', Sinclair QL World, Panini House, 116-120 Goswell Road, London EC1V 7QD. We pay for everything published at the usual rates.

ELEVATOR

by Malcolm Bacchus

The concept of this game is simple. You act as a lift attendant in a building full of people who wish to move to different floors. You have to move them to the correct floors in the minimum number of moves. The floors are numbered on the American pattern, with floor 1 at the bottom, and so on up to a maximum of nine floors.

There are a number of minimum move strategies – but finding them takes time and a logical mind. As in other games, the real challenge is in finding these strategies, not in beating your opponent.

You can play against another person or against the computer. The computer uses an algorithm based on that by Donald E Knuth (Journal of Recreational Mathematics, Vol 2, 1969). It can be expressed in a few simple rules, but the way it sorts out which people have to be transported where (and when) is quite eerie to watch. People are sometimes moved away from the floors they wish to go to at first!

A demonstration routine is included.

Each player has an identical copy of the playing area. The left hand grid represents a building, which will be a random number of storeys high. Both the number of storeys and the distribution of the people are randomised for each game.

Each person is identified by the number of the target floor. 4 is a person who wants to go to the fourth floor.

The grid on the right hand side is the lift shaft, with the lift on the ground floor (floor 1). The maximum lift load varies from game to game.

A move consists of taking the lift up, or down, one floor, regardless of whether any loading or unloading is done at that floor. The winner will be the player whose lift has moved the shortest distance overall. Before the lift moves, you will be able to load and unload any number of passengers, subject only to the capacity of the lift and the floor at the time. Scoring depends only on the number of floors passed, not on the number of passengers moved.

To play, the players take alternate turns.

To load or unload passengers, you swap them either with other passengers, or with an empty space, by pressing the number key which corresponds to the passenger or space you wish to move. Press the number for the item in the LIFT first, and the FLOOR second, without using Enter. For instance, if you press 52, number 5 in the lift will be swapped with number 2 on the adjacent floor. If you hit an illegal number, the QL will beep and you must try again. Spaces are selected with the space bar.

The lift begins, empty, on floor 1, so to load up (say) a 3 person, you would press SPACE 3, to swap an empty space with a 3.

When you are happy with your selection of people, press the UP or DOWN keys to move up or down a floor. Your turn then ends.

All operations are prompted in the lower section of the playing area.

To win, the lift must be returned to the ground floor at the end of play. The program will recognise when the game ends and tell you who has won. Each player has an equal number of turns – remember that your opponent gets one more go after you have finished.

After a game you will be offered another game with a different building and lift. ESC interrupts the game at any stage, and you will be offered another game plan.

To quit to Basic, press Q.

The version of the game that appears here does not include remarks within the game itself, and is designed for F1 (monitor) only, although it is perfectly playable on F2.

Doughnuts

You may like to revise the program so that a player can win by moving all the passengers either (a) with the fewest changes of passenger or (b) with the fewest stops at each floor. A discussion of these problems is given in Martin Gardner's book *Knotted Doughnuts and other mathematical Entertainments*. As far as I am aware, no winning algorithm has yet been devised for either of these variants!

```
110  MODE 4:RANDOMISE
120  DIM lift_state(1),lift_print(1),lift_pos(1)
130  DIM moves(1),player (1),name$(1,13)
140  banner
150  initialise
160  REPeat megaloop
170    IF result=-2 THEN bye_bye
180    PAPER#6,6:PAPER#7,2:FOR i=0 TO 7:CLS#i
190    message 0," 1 or 2 player game? "," ...
     Press <1> or <2>",""
200    CLS#1:INK#1,7:PRINT#1,"Alternatively ..."|"
     Press <D> for a demo"|" or Press <Q> to
     quit":INK#1,2
210    game_type=get_reply (0,"D12Q")-1
220    SELect ON game_type
230      =0:player(0)=0:player(1)=0:name$(0)=
     "COMPUTER":name$(1)="COMPUTER"
240      =1:player(0)=1:player(1)=0:name$(0)=
     "PLAYER #1":name$(1)="COMPUTER"
250      =2:player(0)=1:player(1)=1:name$(0)=
     "PLAYER #1":name$(1)="PLAYER #2"
260      =3:bye_bye
270    END SELect
280    whose_go=0
290    get_data
```

```
300   DIM people(1,h,p),liftp(1,lo)
310   set_up:populate
320   IF NOT player(0) THEN info
330   REPeat loop
340     floor=lift_pos(whose_go)
350     IF player(whose_go) THEN
360       result=result+(whose_go+1)*player_go
370       ELSE
380       result=result+(whose_go+1)*computer_go
390     END IF
400     IF result<0 THEN NEXT megaloop
410     IF result AND whose_go THEN EXIT loop
420     AT#(whose_go+4),0,16: PRINT#(whose_go+4),
    moves(whose_go);
430     IF player(0) THEN whose_go=NOT whose_go
440   END REPeat loop
460   BEEP 12000,10,30,1000,-7
470   SELect ON result
480     =1:PRINT#4,|" WINNER IN ";moves(0); "
    MOVES":CLS#5
490     =2:PRINT#5,|" WINNER IN ";moves(1); "
    MOVES":CLS#4
500     =3:FOR i=4,5:PRINT#i,|" DRAW: IN
    ";moves(1); " MOVES"
510   END SELect
520   message 0, "","" Press any key to continue",
    "":PAUSE
530 END REPeat megaloop
1000 DEFine FuNction player_go
1010 REPeat ploop
1020   message whose_go," SELECT PERSON or SPACE IN
    LIFT"," or"," CHANGE FLOORS BY ↑ ↓ "
1030   REPeat loopi
1040     p1=get_reply(1,hnum$)-3
1050     IF p1<0 THEN
1060       IF p1=-3 AND floor=1 THEN BEEP 3000,220:
    NEXT loopi
1070       IF p1=-4 AND floor=h THEN BEEP 3000,220:
    NEXT loopi
1080       p2=p1:EXIT ploop
1090     END IF
1100     FOR li=1 TO lo
1110       IF p1=liftp(whose_go,li)
1120         box li:EXIT loopi
1130       END IF
1140     END FOR li
1150   BEEP 3000,220
1160   END REPeat loopi
1170   message whose_go," SELECT PERSON or SPACE ON
    FLOOR"," or"," "&print_out$(p1)&" to cancel
    selection"
1180   REPeat loopn
1190     p2=get_reply(1,hnum$)-3
1200     IF p1=p2 THEN box li:NEXT ploop
1210     IF p2<-2 THEN BEEP 3000,240:NEXT loopn
1220     IF p2<0 THEN EXIT ploop
1230     FOR fi=1 TO p
1240       IF p2=people(whose_go,floor,fi) THEN
    EXIT loopn
1250     END FOR fi
1260   BEEP 3000,240
1270   END REPeat loopn
1280   switcheroo li,fi:reprint
1290 END REPeat ploop
1300 SELect ON p2
1310   =-1,-2:RETurn p2
1320   =-3:win=move_lift(down): lift_state
    (whose_go)=down
1330   =-4:win=move_lift(up):lift_state
    (whose_go)=up
1340 END SELect
1350 RETurn win
1360 END DEFine player_go
1370 DEFine FuNction computer_go
1380 message whose_go,"","   MY GO .....","""
1390 PAUSE 20
1400 IF lift_state(whose_go)=up
1410   IF ask_if_floor_up THEN
1420     into_lift lift_state(whose_go)
1430     win=move_lift(up)
1440     ELSE
1450     lift_state(whose_go)=down
1460     RETurn computer_go
1470   END IF
1480   ELSE
1490   into_lift lift_state(whose_go)
1500   win=move_lift(down)
1510   IF NOT ask_if_any_up THEN lift_state
    (whose_go)=up
1520 END IF
1530 RETurn win
1540 END DEFine computer_go
1550 DEFine FuNction get_reply(r,s$)
1560 REPeat getloop
1570   ss$=INKEY$(-1)
1580   es=CODE(ss$)
1590   SELect ON es
1600     =208:IF r THEN RETurn -1
1610     =216:IF r THEN RETurn 0
1620     =REMAINDER
1630       n= ss$ INSTR s$
1640       IF n>0 THEN RETurn n
1650   END SELect
1660 BEEP 3000,200
1670 END REPeat getloop
1680 END DEFine
1690 DEFine PROCedure message(c,a$,b$,c$)
1700 CLS#0:CLS#1:PRINT#c,a$|b$|c$;
1710 END DEFine message
1720 DEFine PROCedure box(pp)
1730 chan=10+whose_go
1740 xstart=w*pp-13
1750 ystart=hw-w*floor+2
1760 OVER#chan,-1
1770 BLOCK#chan,12,10,xstart,ystart,7
1780 OVER#chan,0
1790 END DEFine
1800 DEFine PROCedure reprint
1810 FOR j=1 TO p
1820   CURSOR#(6+whose_go),5+w*j,154-w*floor
1830   PRINT#(6+whose_go),print_out$(people
    (whose_go,floor,j));
1840 END FOR j
1850 FOR i=1 TO lo
1860   CURSOR#(10+whose_go),w*i-13,lift_print
    (whose_go)
1870   PRINT#(10+whose_go),print_out$(liftp
    (whose_go,i));
1880 END FOR i
1890 END DEFine reprint
1900 DEFine FuNction print_out$(nu)
1910 IF nu=0 THEN RETurn "_"
1920 RETurn nu
1930 DEFine FuNction move_lift(sta)
1940 PAPER#(10+whose_go),6-4*whose_go
1950 sg=2*sta-1
1960 SCROLL#(whose_go+10),-sg*w
1970 PAPER#(10+whose_go),4
1980 lift_print(whose_go)=lift_print(whose_go)-sg*w
1990 lift_pos(whose_go)=lift_pos(whose_go)+sg*1
2000 moves(whose_go)=moves(whose_go)+1
2010 IF lift_pos(whose_go)=1 THEN RETurn check_win
2020 RETurn 0
2030 END DEFine move_lift
2040 DEFine PROCedure into_lift (status)
2050 IF status=1 THEN
2060   FOR i=1 TO lo
2070     FOR j=1 TO p
```

```
2080      IF liftp(whose_go,i)<people
    (whose_go,floor,j) THEN switcheroo i,j
2090      END FOR j
2110    ELSE
2120    FOR i=1 TO lo
2130      FOR j=1 TO p
2140        IF liftp(whose_go,i)>people
    (whose_go,floor,j) THEN switcheroo i,j
2150      END FOR j
2160    END FOR i
2170 END IF
2180 reprint
2190 END DEFine into_lift
2200 DEFine FuNction ask_if_floor_up
2210 IF floor=h THEN RETurn 0
2220 FOR i=1 TO lo:IF liftp(whose_go,i)>floor THEN
    RETurn 1
2230 FOR i=1 TO p:IF people(whose_go,floor,i)>floor
    THEN RETurn 1
2240 RETurn 0
2250 END DEFine ask_if_floor_up
2260 DEFine FuNction ask_if_any_up
2270 floor=lift_pos(1)
2280 IF floor=1 THEN RETurn 0
2290 FOR i=1 TO floor-1
2300   FOR j=1 TO p: IF people (whose_go,i,j)>=
    floor THEN RETurn 1
2310 END FOR i
2320 RETurn 0
2330 END DEFine ask_if_any_up
2340 DEFine PROCedure switcheroo (a,b)
2350 temp=liftp(whose_go,a)
2360 liftp(whose_go,a)=people(whose_go,floor,b)
2370 people(whose_go,floor,b)=temp
2380 END DEFine switcheroo
2390 DEFine FuNction check_win
2400 FOR i=2 TO h
2410   FOR j=1 TO p:IF people(whose_go,i,j)<>i THEN
    RETurn 0
2420 END FOR i
2430 floor=floor-1:into_lift(down)
2440 RETurn 1
2450 END DEFine check_win
2470 DEFine PROCedure get_data
2480 h=RND(3 TO 9)
2490 p=RND(4 TO 12)
2500 REPeat lloop:lo=RND(2 TO 15-p):IF lo/1.8<p
    THEN EXIT lloop
2510 hnum$=num$(1 TO h+3)
2520 END DEFine get_data
2530 DEFine PROCedure set_up
2540 result=0:hw=h*w:pw=p*w:lw=lo*w
2550 FOR i=0,1
2560   lift_print(i)=hw-12:lift_pos(i)=1
2570   lift_state(i)=up:moves(i)=0
2580   PRINT#(i+2),"   ";name$(i);
2590   PRINT#(i+4),"  MOVES SO FAR";
2600   CSIZE#(i+6),0,0
2610   BLOCK#(i+6),pw+1,hw+1,18,150-hw,4
2620   FOR j=0 TO h:BLOCK#(i+6),pw,1,18,
    150-hw+w*j,0
2630   FOR j=1 TO h:CURSOR#(i+6),4,152-w*j:
    PRINT#(i+6),j
2640   FOR j=0 TO p:BLOCK#(i+6),1,hw,18+w*j,
    150-hw,0
2650   PAPER#(i+6),4:CSIZE#(i+6),2,0
2660   WINDOW#(i+10),lw+4,hw+2,256*i+36+pw,
    214-hw:CLS#(i+10)
2670   PAPER#(i+10),6-4*i:BORDER#(i+10),1,0:
    CLS#(i+10)
2680   BLOCK#(i+10),lw,w,0,hw-w,4:PAPER#(i+10),4
2690   FOR j=1 TO lo
2700     liftp(i,j)=0
2710     CURSOR#(i+10),w*j-13,lift_print(i):
    PRINT#(i+10),"_"
2720   END FOR j
2730   CURSOR#(i+10),1,lift_print(i)
2740 END FOR i
2750 END DEFine set_up
2760 DEFine PROCedure populate
2770 e$="":le=h*p
2780 FOR i=1 TO h: e$=e$&FILL$(i,p)
2790 FOR i=1 TO h
2800   FOR j=1 TO p
2810     m=RND(1 TO le)
2820     FOR k=0,1
2830       people(k,i,j)=e$(m)
2840       CURSOR#(k+6),5+w*j,154-w*i:PRINT#(k+6),
    print_out$(people(k,i,j));
2850     END FOR k
2860     IF le=1 THEN RETurn
2870     SELect ON m
2880       =1: e$=e$(2 TO le)
2890       =le: e$=e$(1 TO le-1)
2900       =REMAINDER :e$=e$(1 TO m-1)&e$(m+1 TO
    le)
2910     END SELect
2920     le=le-1
2930   END FOR j
2940 END FOR i
2950 END DEFine populate
2960 DEFine PROCedure banner
2970 WINDOW 512,256,0,0:PAPER 0:CLS
2980 WINDOW 512,22,0,0:BORDER 1,255:PAPER 20:INK
    0:CLS
2990 CSIZE 2,0:AT 0,13:PRINT "THE ELEVATOR GAME"
3000 CSIZE 0,0:AT 1,32:PRINT "(c) M. G. BACCHUS
    1990"
3010 END DEFine banner
3020 DEFine PROCedure initialise
3030  FOR i=0,1
3040    WINDOW#i,256,32,256*i,222:PAPER#i,0:
    INK#i,6-4*i:BORDER#i,1,45
3050    OPEN#(i+2),con_:WINDOW#(i+2),256,22,
    256*i,20
3060    PAPER#(i+2),0:BORDER#(i+2),1,255:
    INK#(i+2),6-4*i:CSIZE#(i+2),2,1
3070    OPEN#(i+4),scr_
3080    WINDOW#(i+4),256,22,256*i,42
3090    PAPER#(i+4),0:INK#(i+4),6-4*i:BORDER#(i+4),
    1,255:CSIZE#(i+4),2,1
3100    OPEN#(i+6),con_
3110    WINDOW#(i+6),256,156,256*i,64
3120    BORDER#(i+6),1,255:INK#(i+6),0
3130    OPEN#(i+10),scr_
3140    PAPER#(i+10),6-4*i:INK#(i+10),0
3150    CSIZE#(i+10),2,0
3160 END FOR i
3170 w=14:up=1:down=0:result=0
3180 num$="Q"&CHR$(27)&" 123456789"
3190 END DEFine initialise
3200 DEFine PROCedure bye_bye
3210 message 0,"Quit and return to BASIC?","Press
    <Y> to leave game","      <N> for new game"
3220 IF get_reply(0,"YyNn")>2 THEN RETurn
3230 message 0,"Thank you for playing","the
    Elevator Game.","Bye-bye!"
3240 STOP
3250 END DEFine bye_bye
3260 DEFine PROCedure info
3270 PAPER#6,7:CSIZE#6,0,0:CLS#6
3280 CLS#2:CLS#4
3290 whose_go=1
3300 PRINT#6,|||" The Elevator
    Game"|"-----------------"
3310 PRINT#6,|" Written by:"
3320 PRINT#6,||" M. G. Bacchus"|" (c) July 1990"
3330 PRINT#6,|" DEMONSTRATION OF COMPUTER's PLAY
    ...."
3340 END DEFine
```

QL ROMS AND SPARES

ROMS, MGE (Spanish, MGF (French), MGG (German), JS (English), £20 each. JM (English), £10

MDVS. Complete QL MDV Subunit £20, head and chassis £10, Microswitch £2, Motor £6. Rubber & Plastic Roller £2. MDV2 Stand-off spacer + srew £2. ULA £5. Tr 4,5,6,7 set £2. MDV pcb inc, ULA £11. Prices include UK postage. Send SAE for price list of all QL spares.

Joe Atkinson, 36 Ranelagh Road, Ealing, London W5 5RJ (Mail Order Only).

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